

MONTANA STATE LIBRARY
300 East Lyndale Avenue
Helena, Montana 59601

STATE DOCUMENTS

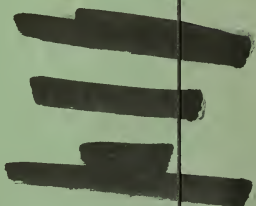
MONTANA STATE LIBRARY
300 East Lyndale Avenue
Helena, Montana 59601

FIFTEENTH
BIENNIAL REPORT

of the

Montana

State Board of Health



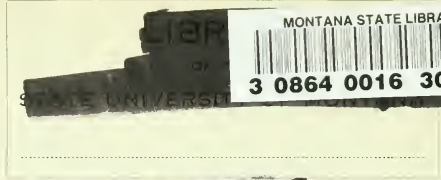
For the Years
1929-1930

Vital Statistics for the Years 1928-1929


S
614
H2r
1929-
1930



MAY 20 2004



MONTANA STATE LIBRARY

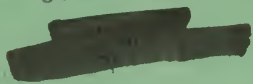


3 0864 0016 3014 7

STATE UNIVERSITY



JUL 16 1987



FIFTEENTH
BIENNIAL REPORT
of the
Montana
State Board *of* Health



For the Years
1929-1930

Vital Statistics for the Years 1928-1929

DISCARDED

JUL 16 1969

LIBRARY
UNIVERSITY OF MICHIGAN

STATE OF MONTANA

State Board of Health

| | |
|---|-------------|
| E. G. Balsam, M. D., President..... | Billings |
| L. H. Fligman, M. D., Vice President..... | Helena |
| P. L. Pampel, M. D.,..... | Livingston |
| E. M. Porter, M. D.,..... | Great Falls |
| George M. Jennings, M. D.,..... | Missoula |
| W. F. Cogswell, M. D., Secretary and Executive Officer..... | Helena |

Division of Communicable Diseases

| | |
|------------------------------------|--------|
| J. H. Crouch, M. D., Director..... | Helena |
|------------------------------------|--------|

Division of Child Welfare

| | |
|--|--------|
| Miss Alma Wretling, R. N., Acting Director, Supervisor of Nurses..... | Helena |
|--|--------|

Bureau of Vital Statistics

| | |
|---|--------|
| W. F. Cogswell, M. D., State Registrar..... | Helena |
| L. L. Benepe, Deputy State Registrar..... | Helena |

Division of Water and Sewage

| | |
|---------------------------------|---------|
| H. B. Foote, Director..... | Helena |
| Jacob Forbes, Assistant..... | Helena |
| W. M. Cobleigh, Consultant..... | Bozeman |

Hygienic Laboratory

| | |
|--|-------------|
| Fred Stimpert, Director..... | Helena |
| Miss Edith Kuhns, Assistant..... | Helena |
| E. D. Hitchcock, M. D. Consultant..... | Great Falls |

Division of Food and Drugs

| | |
|------------------------------------|---------|
| W. F. Cashmore, Jr., Director..... | Helena |
| W. M. Cobleigh, Consultant..... | Bozeman |

STATE OF MONTANA
STATE BOARD OF HEALTH

Helena, December 1, 1930.

Hon. John E. Erickson, Governor,
Helena, Montana.

Sir:

In compliance with Section 2447, Revised Codes of Montana, 1921, I herewith hand you the fifteenth biennial report of the State Board of Health. In doing so I wish to thank you most heartily for your continued support in all public health work.

Yours very truly,

W. F. COGSWELL, M. D.,
Secretary.

FOREWORD

The activities of the State Board of Health during the past biennium will be found in detail in the reports of the heads of the various divisions, which are included in this report.

With two exceptions, the state has been remarkably free from serious epidemics during the past two years. There was a serious epidemic of typhoid fever in the City of Helena during the fall of 1929. This was due to the plugging of a sewer, which resulted in a connection between the sewer and one of the public water supplies. A detailed description of this epidemic from an epidemiological standpoint will be found in the report of the epidemiologist.

During the winter of 1929 and 1930 there was a greatly increased incidence of scarlet fever in Great Falls. It was of a very mild nature and consequently difficult to control on account of the fact that many of the cases were not seen by a physician and were not reported nor quarantined. The fatality rate was low.

Never in the history of the state has the incidence of diphtheria been so low. This is probably due to the fact that a large number of the children in the state have been immunized against this disease as a result of special campaigns that have been put on by various local and county health departments. Diphtheria is a disease that can be eradicated by a properly organized effort. If the organized medical profession would adopt the slogan "No Diphtheria by 1935," and each physician of the state would see to it that the children under his care were immunized, the disease would be stamped out. In the absence of such organized effort on the part of the medical profession, it is necessary for health departments to put on immunization campaigns.

During the past two years Montana has been remarkably free from infantile paralysis (poliomyelitis), only a few scattered cases occurring. This disease has occurred in epidemic form in many of the states, and some of the states bordering upon Montana. It is the prediction of many health officials that next year will be an infantile paralysis year.

As the only recognized effective treatment for this disease is the early use of convalescent serum, we believe that steps should be taken whereby this serum can be produced by one of the laboratories in the state, so as to be available in case of emergencies. If this is done, it will be necessary to have a special appropriation of the legislature for this purpose.

During the years 1927, 1928 and 1929, the incidence of epidemic cerebro-spinal meningitis was markedly increased in the state over previous years. This was quite general over the state, no particular epidemic occurring. During the first eleven months of 1930 the disease appears to be declining.

Smallpox is still with us, and will be, so long as people fail to protect themselves by vaccination.

Rocky Mountain Spotted Fever. The unwritten history of the in-

vestigational work of Rocky Mountain Spotted Fever would, if written, read like a romance. From the inception of the work by the Montana State Board of Health in April, 1901, until the present time, the investigation and control work for Rocky Mountain spotted fever has been going on.

The action of the members of the first State Board of Health of Montana in contributing their salaries and expenses to the work; how the services of Dr. Wilson and Dr. Chowning of the University of Minnesota were enlisted; a description of their work; the enlistment of the United States Public Health Service and a description of its work and of its efforts through all the years, culminating in the production of the Spencer-Parker vaccine for the prevention of the disease; the work of Dr. Ricketts of the University of Chicago, and the co-operation of that University and the American Medical Association, financial and otherwise; the work of the Federal Bureau of Entomology, in co-operation with the State Entomologist of Montana, in working out the life history of the wood tick; the work of Noguchi of the Rockefeller Foundation, and his attempts to produce a preventive serum; the work of Wolbach of Harvard University, in discovering the causative organism; the failure of all laboratory workers to cultivate this organism on artificial media; the discovery of a parasite to the wood tick by Brumpt in France; the bringing of this parasite from France into America and to Montana; the development of millions of these parasites from a few original ones which were first introduced; the formation of the State Board of Entomology of Montana for the purpose of study and control of the disease and for the purpose of co-ordinating the activities of the different organizations studying the disease; the erection of a laboratory at Hamilton, Montana, by the state legislature for the sole purpose of furnishing a proper place for research work and for the production of the vaccine by the United States Public Health Service; the appointment of a Rocky Mountain spotted fever committee, representing the various Rocky Mountain states, at the meeting of the Western branch of the American Public Health Association in Salt Lake City in June, 1930, done for the purpose of enlisting the support of all the Rocky Mountain states in the investigational work of the disease; the meeting of this committee in Hamilton, Montana, where it was decided to ask the United States Public Health Service to take over all this work, including the parasite work; the awarding of two gold medals by the American Medical Association to workers on this disease; the tragic death of six laboratory workers during the intervening years—all this should be written up in detail and kept as a permanent record, and should be done before those who have been active in the work, pass on.

At the present time we wish to call attention to the fact that in 1908 Dr. Ricketts and Dr. Tuttle predicted that the disease was bound to spread. This prediction has been verified. It has spread. In 1901 but two states had recognized and reported the disease. Since that time it has been reported in thirteen states. It seems to be spreading beyond the Rocky Mountain area.

Until this year it was generally considered that *Dermacentor ander-*

soni was the only wood tick that produced the disease in nature, although laboratory experiments had shown that it could be produced by *Dermacentor variabilis* (eastern dog tick) and *Dermacentor Occidentalis*, which is found in California. Two cases of the disease occurred in Nebraska this year and according to reports on the investigation made by officers of the United States Public Health Service, these cases were probably due to the bite of an infected tick of *variabilis* (eastern dog tick) variety.

There are portions of eastern Montana and western Dakotas where both *Dermacentor andersoni* and the *Dermacentor variabilis* are found, thus making it possible for *variabilis* to become infected. A similar condition exists in western California where there is territory common to the three ticks, *andersoni*, *variabilis* and *occidentalis*, so it will be seen that there is potential danger of the disease spreading beyond the Rocky Mountain areas.

We predict that in years to come, many of the indefinite infections which have not yet been classified will be found to be due to the bite of a wood tick. There is much work yet to be done along these lines.

The control of these ticks appears to us to be a national problem and should be undertaken by the federal government. At the present time the control of these ticks by means of a parasite appears to offer the best prospects of results. The work that is being done in Montana in developing this parasite, is the first work that has ever been done with a view to control by a parasite an insect which causes human disease. It seems well worthwhile to push this work vigorously.

The State Board of Entomology attended a meeting of the Western Branch of the American Public Health Association held at Salt Lake City in June, 1930, and presented the problems relating to the control of this disease. A committee was appointed to study the question. This committee met in Hamilton, Montana, on September 24, 1930. At that meeting the states of Wyoming, Idaho, Washington, California and Montana were represented. It was decided that as this disease is no longer a local problem, and on account of the fact that the State of Montana has spent nearly \$300,000.00 in investigational work and has erected a laboratory at a cost of \$60,000.00, that the federal government be asked to take over the laboratory at Hamilton, enlarge it and produce the vaccine on a larger scale, and continue the parasite work begun by the State of Montana. Resolutions to this effect were passed. At a meeting of the American Public Health Association held at Fort Worth in October of this year, Surgeon General Cumming called a meeting of all the state health officers and others interested, to consider the question. As a result of this meeting the following resolutions were unanimously passed:

Resolution on Tick-Borne Diseases.

WHEREAS, for the past twenty-eight years the State of Montana has been actively engaged in the study and control of Rocky Mountain spotted fever and other tick-borne diseases, at an expenditure of approximately \$300,000.00, and in 1928 erected a new and modern laboratory at Hamilton, Montana, at a cost of

\$60,000.00, without financial aid from the other infected states; and

WHEREAS, The Bureau of the Public Health Service co-operating with the State of Montana, has discovered and is making an effective vaccine from a highly virulent local strain of ticks and with enlarged facilities could increase the production of this vaccine to meet the growing demand; and

WHEREAS, The Montana State Board of Entomology is engaged in the use of imported tick parasites and believes that the use of such parasites offers the most practical and most promising method of control of ticks; and

WHEREAS, The problem of ticks and of the human diseases which they transmit is not a local one affecting Montana only, but affects as well the following states: Washington, Oregon, Idaho, Colorado, Wyoming, Utah, California and Nevada, and is threatening the adjoining states of North Dakota, South Dakota, Nebraska and New Mexico, and is a potential menace to all of the states of the Union; and

WHEREAS, The Public Health Service has for many years been engaged in the study of this group of tick-borne diseases; and

WHEREAS, It is the expressed desire of the State of Montana that this work be turned over to the Bureau of the Public Health Service:

THEREFORE, BE IT RESOLVED, That the Surgeon General of the Bureau of the Public Health Service be requested to take over and assume full control of investigations of tick-borne, human diseases and of the control of ticks by parasites; and

BE IT FURTHER RESOLVED, That Congress be requested to pass an Act authorizing the Bureau of the Public Health Service to take over the laboratory located at Hamilton, Montana, and extend the scope of the work as may be deemed necessary by the Surgeon General of the Public Health Service.

The Surgeon General indicated that he believed that the control of this disease was really a national question and he would be glad to take over the work, providing a bill be passed by Congress authorizing it. Many of the state health officers who were present at the meeting pledged their support and their influence in having the necessary legislation passed. Before the laboratory can be turned over to the federal government it will be necessary to have authorization from the state legislature of Montana. It is proposed at the coming legislature to have such a bill introduced.

While the State Board of Entomology somewhat reluctantly gives up the parasite work which it started and which is extremely fascinating, it believes that the work can be pushed much more vigorously and much more can be accomplished by having the resources of the federal government behind it.

A report on the activities of the various divisions follows:

BIENNIAL REPORT OF THE DIVISION OF COMMUNICABLE DISEASES

By J. H. Crouch, M. D., C. P. H., State Epidemiologist

The division of communicable diseases was established as a part of the Montana State Board of Health's organization in 1919, when the legislature created the position of State Epidemiologist, whose duties are "to study the causes and prevalence of disease in the State of Montana, to take proper steps to check such diseases, and to assist the local and county health officers in the suppression of these diseases, and perform such other duties as the State Board of Health may direct."

Besides the duties concerning diseases which are specifically mentioned, certain other routine duties have been assigned to the epidemiologist. These include general supervision of the activities of the county and local health officers; securing from them more complete and regular reports of communicable diseases; checking their records of communicable diseases and the minutes of meetings of county and local boards of health; seeing that the proper and legal health organization is set up in the various communities of the state; and inspection of the records of hospitals to see that they comply with the vital statistics law.

COUNTY AND LOCAL HEALTH OFFICERS

There are 56 county health officers in the state and the number of local health officers varies considerably, since, with incorporated towns, each may have its own health officer, or, if its population is less than 5,000, it may place itself under the jurisdiction of the county health officer. On November 1, 1930, there were 33 local health officers. In addition to these 89 county and local health officers, there are 10 deputy county health officers whose exact legal status is not clear.

In checking on the health organization, many discrepancies were noticed. In the incorporated towns and cities, the law states that the municipal authorities shall appoint a local board of health consisting of three men. No term of office is specified but they are removable at the pleasure of the municipal authorities. One of the men so appointed must be a physician. The local board of health thus appointed must then hold an organization meeting and elect one of themselves as secretary and health officer. The member so elected is usually but not necessarily the physician. It is further provided that towns of less than 5,000 inhabitants may place themselves under the county board of health instead of setting up their own health organization. This is done by sending written notice to this effect to the state board of health and to the county board of health. When an incorporated town or city sets up its own board of health, the secretary must immediately write to the state board of

health, notifying them of his appointment and giving the names of the members of the local board.

There are 42 incorporated cities and 71 incorporated towns in the state, and only a very few of them had officially notified the state board of health of the appointment of a local board or that they had placed themselves under the jurisdiction of the county health officer. Approximately 75 per cent of them have been visited during the past two years and in many it was found that the proper organization had been set up, although without notice to the State Board of Health. In others, variations from the legal organization were found. In some towns the county health officer acted at the verbal request of the municipal authorities; in many towns the city council would appoint a physician as health officer and no local board of health would be appointed at all, and in a majority of the places where a local board was appointed, there was no record of meetings held or any activities performed by the board. The supervision of health matters and enforcement of health laws was left as a personal responsibility of the health officer.

In the set-up of the county health organization, the law provides that the county commissioners automatically become members of the county board of health. As commissioners, they appoint a physician who becomes a fourth member of the county board of health and acts as its secretary and county health officer. The county health officer so appointed does not have any specified term of office but is removable at the pleasure of the board of county commissioners, who also fix his salary.

The county board of health is required to meet at least once each quarter, at which time the county health officer presents a written report of his activities and the health conditions of the county during the previous quarter, and acting as secretary of the board, he keeps minutes of the meeting in a book especially provided for that purpose.

Instead of the health officer being appointed for an indefinite period and at a fixed salary, as the law provides, it was frequently found that the position of county health officer was combined with that of county physician and bids were requested for the combined positions. Contracts were awarded for a year's service.

County commissioners usually seem much more interested in the question of medical attention to the poor than in the preservation of health and the enforcement of health laws. In some counties the health officer is not allowed any travel or other expense, as the law provides, and this naturally tends to limit the extent of his activities. In a majority of the counties there have been no formal meetings of the county board of health, which the law specifies shall be held at least once each quarter. The county health officer would usually appear before the board of county commissioners at some time during their meeting and inform them about some portion of his work, which usually concerned the treatment of the poor. In only three or four counties was it found that the health officer had a book of minutes showing regular quarterly meetings of the county board of health.

The book of records of communicable diseases as kept by county or

local health officers was usually found to be in very good shape. Some health officers, however, especially in the smaller towns, did not keep any record at all.

The regulations of the state board of health require that each county or local health officer shall make a report to the state board of health at the end of each week about the number of cases of communicable disease occurring in his jurisdiction during the week. Prior to 1928 when there were 96 county and local health officers in the state, the average number of weekly reports received was 20 to 25. During the first ten months of 1930, with 89 county and local health officers, the average number of reports received each week has been 30. Health officers of the more populous counties and of the larger towns usually report with a fair degree of regularity. Delinquencies are much greater from the sparsely settled counties and smaller towns. This is probably due very largely to the fact that no cases have occurred. It is unquestionably true, however, that many cases of reportable disease have occurred in these communities of which we have no record.

The number of health officers who have not sent in as many as 12 weekly reports during the year, or an average of one report per month, is as follows:

In 1928 there were 19 county and 33 local health officers; in 1929 there were 18 county and 18 local health officers, and during the first ten months of 1930 the number who have sent in less than ten weekly reports is 21 county and 13 local health officers. Thus it will be seen that during the past three years there has been considerable improvement in reporting among the local health officers but little or none among the county health officers. Further inquiry about these county health officers who are so negligent shows that with practically all of them the position is combined with that of physician to the poor, and both the physician and the county authorities are more interested in the work for the poor than they are in public health.

Much thought has been given to the question of securing more regular and complete reporting of communicable diseases in the state. In considering the question of coercion, one of the difficulties encountered is that the state law requires monthly reports from local and county health officers, while state regulations specify weekly reports. It is recommended that an effort be made to change the state law so that it will coincide with the regulations.

HOSPITALS

In April, 1930, the duty of checking records of hospitals to see that they comply with the vital statistics law, was assigned to the epidemiologist. Since that time the records of 15 hospitals have been inspected and only three of them were found to comply with the law. The majority of the other 12, however, promptly made the necessary changes in their record forms.

The following is a table of communicable diseases reported (including deaths from communicable diseases not previously reported as cases) for the years 1928, 1929, and the first ten months of 1930.

| Disease | 1928 | 1929 | 1930 (10 mos.) |
|-----------------------------------|--------|-------|-------------------|
| Tuberculosis | 448 | 536 | 445 |
| Typhoid Fever..... | 133 | 371 | 121 |
| Smallpox | 853 | 547 | 267 |
| Diphtheria | 231 | 142 | 59 |
| Septic sore throat..... | 21 | 23 | 11 |
| Scarlet fever | 846 | 1,139 | 1,076 |
| Measles | 840 | 4,308 | 645 |
| German measles | 54 | 18 | 23 |
| Whooping cough | 313 | 349 | 730 |
| Chickenpox | 1,093 | 822 | 470 |
| Mumps | 116 | 1,163 | 2,137 |
| Influenza | 18,655 | 1,627 | 116 |
| Meningococcic meningitis..... | 177 | 149 | 56 |
| Poliomyelitis | 65 | 7 | 16 |
| Encephalitis | 12 | 14 | 8 |
| Rocky Mountain spotted fever..... | 32 | 20 | 20 |
| Tick paralysis ..... | ..... | 1 | 4 |
| Tularaemia | 6 | 2 | 3 |
| Erysipelas | 32 | 50 | 38 |
| Trachoma | 222 | 179 | 13 |
| Gonorrhoea | 226 | 361 | 193 |
| Syphilis | 632 | 1,139 | 294 |
| Undulant fever | 2 | 3 | 4 |
| Psittacosis ..... | ..... | ..... | 2 |
| Ophthalmia neonatorum | 1 | ..... | 4 |
| Gastro-enteritis ..... | ..... | ..... | 8 |
| Pellagra ..... | ..... | ..... | 1 |
| Dysentery ..... | ..... | 1 | 17 |
| Other diseases | 28 | 24 | 21 |

The following is a tabulated list of special trips and investigations made in 1928, 1929, and the first 10 months of 1930. Where special comment about these investigations seems to be justified, they will be mentioned in the discussion of the various diseases.

| | 1928 | 1929 | 1930 (10 mos.) |
|---|------|------|-------------------|
| Typhoid fever | 7 | 6 | 3 |
| Smallpox | 3 | 2 | 4 |
| Diphtheria | .. | .. | 5 |
| Septic sore throat..... | 1 | 1 | 2 |
| Scarlet fever | .. | .. | 3 |
| Measles | .. | 1 | 1 |
| Influenza | 11 | 4 | .. |
| Epidemic meningitis | 4 | 1 | 1 |
| Poliomyelitis | 15 | 6 | 2 |
| Tick paralysis | .. | 1 | .. |
| Trachoma | 11 | 2 | .. |
| Gonorrhoea | .. | .. | 1 |
| Syphilis | 1 | 1 | 1 |
| Gastro-enteritis | .. | 1 | 3 |
| Undulant fever | .. | 1 | .. |
| Psittacosis | .. | .. | 1 |
| Miscellaneous (not communicable disease)..... | 3 | 7 | 12 |
| Inspections of State Institutions..... | .. | 5 | 1 |
| Inspections of Federal Institutions..... | 2 | 1 | 1 |
| Visits to county and local health officers..... | 53 | 66 | 70 |

The following biologicals for immunization campaigns have been purchased through the State Board of Health by physicians and others in various sections of the state. Amounts are expressed as number of immunizations.

| | 1928 | 1929 | 1930 (10 mos.) |
|-----------------------|-------|-------|-------------------|
| Smallpox | 1340 | 1720 | 1940 |
| Toxin-antitoxin | 2980 | 3070 | 1380 |
| Toxoid ..... | ..... | ..... | 795 |
| Typhoid vaccine..... | 1200 | 1344 | 184 |

Tuberculosis. In Montana tuberculosis has shown no important change in incidence during the past two years as compared with the two previous years, although during the past decade there has been a general reduction of approximately ten per cent. As a basis for determining the incidence of tuberculosis, the number of deaths is much more dependable than the number of cases reported, since the reporting of cases is still very incomplete in the state.

The number of deaths from tuberculosis in Montana was 360 in 1928 and 357 in 1929, as compared with 371 in 1926 and 361 in 1927. This shows a total reduction of 15 deaths for the biennium. The number of new cases reported was 286 in 1928 and 268 in 1929. A comparison of these figures with those for 1926 and 1927, which were 276 and 222, respectively, shows an increase of 56 cases, but this is probably due to better reporting rather than to increased incidence.

Typhoid Fever. Typhoid fever during the past few years has been less prevalent than it was a decade or more ago but during the past two years it has shown an increase. In 1926 and 1927 there were just a little more than 100 cases reported each year. In 1928 a total of 133 cases was reported; in 1929, 371 cases, and during the first ten months of 1930, 121 cases were reported.

The one factor which continues to be very important in causing the infection is the persistent habit among the people of Montana of drinking surface water. The irrigation districts along the Yellowstone River and the Milk River continue to have a large incidence of typhoid and we almost invariably obtain a history of drinking water from irrigation ditches. Throughout the state, campers and vacationists persist in drinking water from streams. With the continued improvement of state roads, camping and picnicking are becoming more and more popular, and this, to my mind, is largely responsible for the increase in typhoid. Many warnings have been issued by the state board of health calling attention to the dangers of drinking surface water and urging the use of typhoid vaccine before going on camping trips, but little heed seems to be paid to the warnings.

In the last biennial report there was a discussion of the situation in Libby where for a number of years 20 or more cases of typhoid occurred each year: in fact, it was seldom that there was not someone in the town sick with the disease. After many studies and investigations, the conclusion was reached that milk was very largely, if not wholly, responsible for the infection, and acting upon the advice of the state board of health, the city authorities of Libby passed an ordinance re-

quiring compulsory pasteurization of all milk sold within the town limits. This ordinance went into effect in May, 1929. Since that time there have been only two small outbreaks of typhoid in the town, one of five cases in December, 1929, which upon investigation were found to have been infected from a dairy which was selling raw milk in violation of the city ordinance. This dairy claimed to have only six customers at that time and the five cases occurred in two of the families served by them. The dairy owners were warned but not prosecuted, and agreed to stop their violation of the city ordinance. In September, 1930, six more cases occurred and at least three of them were traced directly to this same dairy. A representative of the state livestock sanitary board, who assisted in the investigation, prosecuted the dairy owners and upon their plea of guilty they were fined ten dollars with sentence suspended.

The large increase in typhoid in 1929 was mostly due to a serious epidemic which occurred in Helena in September, when 188 cases occurred in Helena itself, and 28 other cases were reported elsewhere among recent visitors to Helena.

The Epidemic of Typhoid Fever in Helena in 1929. For a period of eighteen months Helena had been entirely free from typhoid fever when on August 22, 1929, a case was reported from St. Peter's Hospital, the patient being a man from East Helena who was taken sick on July 23, 1929, shortly after his return from a four weeks' fishing and camping trip on Crystal Creek and other places. He had constantly drunk surface water while on his trip and was presumably infected in that way. There was no known connection between this and the subsequent cases occurring in Helena.

On August 24, 1929, a second case was reported from St. John's Hospital. The patient was a nursing Sister at St. Ann's infant home, which is connected with St. John's Hospital. Her food and drinking water were the same as used by approximately 200 other people. She had not left the institution grounds for a month or more prior to the onset. She had treated no new patients and no possible source of the infection could be ascertained. The date of onset in this second case was variously given as August 7 and August 12.

On September 5, 1929, the state laboratory reported a positive Widal from a child at St. Joseph's Orphans' Home. The date of onset in this case was given as August 24, 1929.

St. Joseph's Orphans' Home is situated in the valley north of the corporate limits of Helena and is supplied with city water. An irrigation ditch running through the grounds carries water which contains city sewage. The superintendent reports that this water was used on two occasions for irrigating vegetables in the garden. The last irrigation occurred more than thirty days prior to the onset of the case, and the superintendent insists that no vegetables irrigated with this sewage water were ever eaten because the crop was a total failure. On account of the sewage water going through the grounds, however, it was felt that this might be a possible source of the infection.

On September 10, 1929, another case was reported to the city health

officer, the patient being a man living on Lyndale avenue and working for the Northern Pacific Railway.

The epidemiologist accompanied the city health officer in the investigation of these last two cases. It was noted that both of them were supplied with water from the Eureka system, and with coincident reports from our water laboratory showing *B. coli* in this water supply, we felt that this water might be a possible source of the infection.

On the morning of September 14 a physician made a verbal report of four additional cases, two being in St. Peter's Hospital and two in St. John's Hospital. Three of these patients lived in the Sixth Ward district which is supplied by the Eureka water system, and the other one lived on Eleventh avenue. This last case was an eighteen year old boy and his condition was such that we could not obtain any information from him which would lead us to a definite opinion about the source of his infection. The other cases were also visited by the state epidemiologist and the local health officer, and a careful inquiry about all possible sources of infection was made. Outside of the fact that they all drank Eureka water, the only suspicious evidence found was that most of them had obtained their groceries and vegetables from the three or four grocery stores located near the Northern Pacific depot on the north end of Helena avenue. The grocerymen were visited and each of them said that he had purchased vegetables from time to time from farmers living in the valley, and particularly from Mr. Yugas and certain Chinese whose names they did not know. No definite information could be obtained as to dates, amounts, or kinds of vegetables purchased. The vegetable phase of the investigation was handled by the director of the food and drugs division and reference will be made later to his report.

During the next few days several other cases of typhoid were reported to and investigated by the city health officer and the state epidemiologist. Beginning in the evening of Tuesday, September 17, however, large numbers of people began calling on the city health officer for typhoid vaccine, and the volume of this work became so great by the next day that after this date the city health officer's time was occupied entirely with this procedure and the epidemiologist took over the work of investigating the cases and obtaining case histories. The regular machinery for reporting of cases by physicians very promptly and completely broke down. Some cases were reported verbally by physicians, either to the city health department or the state health department, but information about most of them was obtained through laboratory reports, reports by neighbors and other interested citizens, the running down of rumors, and investigations by the school nurse who was employed a few days later for the emergency.

During the week ending September 21, 1929, thirty-seven cases were reported; during the week ending September 28, thirty-nine cases; October 5, forty-eight cases; October 12, twenty-seven cases; October 19, fifteen cases; October 26, six cases; November 2, three cases; and November 9, one case. This makes a total of 183 patients who were taken sick in Helena. During the epidemic, four other typhoid patients were brought to Helena for hospitalization who were obviously infected elsewhere.

These, with the first case mentioned in this report, make a total of five cases of typhoid which were sick in Helena during the epidemic but which had no connection with the Helena cases, so that the Helena physicians and hospitals treated a total of 188 cases during the epidemic.

During the latter part of September and in October, we received reports of 28 cases of typhoid occurring elsewhere in patients who had recently been in Helena and had drunk Eureka water while here. Twenty-four of these were reported from other places in Montana and four of them from other states.

This gives a grand total of 216 cases of typhoid connected directly or indirectly with the Helena epidemic. Since five of these cases lived outside of Helena and gave no history of previous visits to Helena, being merely brought in for hospital care, these may be eliminated from the study, and this leaves 211 cases which were apparently infected in Helena. The geographical distribution of cases is as follows:

One hundred forty-one lived in the district supplied by the Eureka water system; 39 cases lived elsewhere in Helena; these were evenly scattered throughout the city; 31 cases occurred elsewhere in recent visitors to Helena, and three of them from nearby towns were brought to Helena hospitals for treatment.

A fairly complete history was obtained of 188 cases, and in trying to determine the source of the infection, careful consideration was given to the question of vegetables raised in the valley, since frequent mention was made of this as a possible source. Fifty patients gave a history of eating vegetables from the valley; 137 denied eating these vegetables, and one was uncertain. It was impossible in a majority of the cases to obtain a definite history of the kinds of vegetables eaten or the dates when they were purchased. The four grocerymen at the north end of Helena avenue, from whom the majority of the people in the Sixth Ward purchased groceries and vegetables, stated that at various times they had purchased vegetables from Mr. Yuhas, Mr. Fisher, or one of the Chinese. They kept no record of purchases, and when purchases were made from a Chinese they did not even know his name. All purchasers of local-grown vegetables from these stores are included in the fifty cases. The others purchased vegetables from hucksters' wagons. Very nearly all vegetables which are grown locally and sold in Helena are produced by about two white farmers and some three or four Chinese, all having truck farms in the valley. The director of the food and drugs division of the state board of health made a careful investigation to determine the possibility of the use of sewage water for irrigation of these vegetables. His report was to the effect that he obtained definite proof that none of the white farmers had used any sewage water for irrigating vegetables, and that the Chinese farmers were so located that it was impossible for them to obtain any sewage water for irrigation during the growing season. For these reasons it was felt that sewage-irrigated vegetables as a possible source of infection could be ruled out.

In investigating the milk supply, it was found that the per cent of cases who obtained milk from the various dairies, corresponded very

closely to the per cent of the total milk supply of the city which that dairy furnished. This was true with all the dairies except one which furnished approximately 3 per cent of the total milk supply for the city, and it was found that 18 patients, or approximately 10 per cent of the total cases, used milk from this dairy. Eight of these cases lived in various sections of the town, gave no history of drinking Eureka water, and each had a very severe attack, with sudden onset, such as usually occurs with milk-borne infection. The other 10 cases gave a history of drinking Eureka water. Five of them were mild or moderate in severity and the other five were severe with sudden onset.

The dairy in question was carefully inspected by a representative of the Livestock Sanitary Board and his report was that the dairy used city water from the Eureka system in the milk house and the home, and that the method of cooling the milk was to bottle and cap it while warm and then set the bottles in a trough filled with city water in order to cool the milk. The water in this trough was of sufficient depth so that the smaller bottles were completely submerged, and there was a strong probability of the milk becoming infected in this way if the water itself were infected.

Helena's public water supply consists of four separate systems. The source of each is separate and the distribution separate except in cases of emergency, when cross-connections may be opened. The largest of these is the Ten Mile system, which supplies approximately 77 per cent of the population of the city. Next in point of size is the Eureka system, which supplies approximately 11 per cent of the population, and the two smaller systems, the West Side and Hale, which supply each about 6 per cent of the population.

As was previously stated, 141 of the patients lived in the district supplied by the Eureka water system, and drank this water constantly. Twenty-five other patients living elsewhere in Helena gave a definite history of working or visiting in the section supplied by the Eureka water system and of drinking this water. The 31 cases living elsewhere who had been recent visitors to Helena, all gave a history of drinking Eureka water, and with many of them there seemed to be no other possible source of infection while in Helena.

Thus it is seen that in 97 per cent of the cases there was direct connection with that portion of the water system of Helena which furnishes only 11 per cent of the total water supply.

The date of onset was recorded in all of the cases occurring in Helena and in some of the cases occurring elsewhere. When the cases were arranged according to date of onset it was found that the beginning of the epidemic was August 20. Between that date and August 31, ten cases occurred. During the first ten days in September there was a sharp and steady rise in the number of cases, and from September 10 to October 1 this high level was maintained. After October 1 there was a very sharp drop in the number of cases until on October 5 no cases occurred. From October 6 to October 22, fifteen cases occurred.

If we consider that the average incubation period in typhoid fever is about two weeks and count back that length of time from the date of

onset to determine the date of infection, we find that the date of probable infection corresponds exactly with the record of contamination in the Eureka water system. The first record of contamination in the Eureka water was on August 2. Contamination continued and apparently increased until September 16, when chlorination was started. Two weeks later, or after October 1, there was a very sharp drop in the number of cases. In each of the 15 cases occurring after October 5 there was a very definite history of close house contact with other cases, and infection was probably received from this source, although they also drank Eureka water.

Summary and Conclusions. A total of 216 cases were connected with the epidemic of typhoid in Helena during the latter part of 1929, and 211 of them were apparently infected in Helena. Of this number 205, or more than 97 per cent, were exposed directly or indirectly to the contamination in the Eureka water supply. The probable dates of infection corresponded very closely to the time when this contamination was shown to be present. A careful investigation of other possible sources of infection failed to produce any evidence that they were involved.

The epidemiological evidence obtained is sufficient to justify the conclusion that contamination in the Eureka water supply was the probable cause of the epidemic.

TABULATION OF TYPHOID CASES IN HELENA

Based on Connection with the Eureka Water Supply.

| | |
|--|-----------|
| Cases living in the district supplied by the Eureka water system..... | 141 |
| Cases living elsewhere in Helena but working or visiting in the section supplied by the Eureka water system, and who drank that water | 25 |
| Cases living in Helena, giving no history of drinking Eureka water, but who used milk from a dairy which used Eureka water in the milk house | 8 |
| Cases living elsewhere, who were recent visitors in Helena, drinking Eureka water. These patients returned to Helena for treatment.. | 3 |
| Cases occurring elsewhere in patients who had recently been in Helena and who drank Eureka water. Twenty-four of these lived in other places in Montana, and four of them in other states..... | 28 |
| <hr/> Total cases giving history of connection with the Eureka water supply | <hr/> 205 |
| Cases occurring in Helena during the epidemic but giving no history of connection with the Eureka water supply. Source of infection not definitely determined..... | 6 |
| Cases from elsewhere, not previous visitors and not infected in Helena. Brought to Helena after onset for treatment..... | 5 |
| <hr/> Total cases connected with the Helena epidemic..... | <hr/> 216 |

Smallpox. In 1928 and 1929 the smallpox incidence continued very high, with Butte furnishing approximately one-fourth of the cases. Many of the outbreaks occurring elsewhere in the state could trace the source of the original case to Butte, also. During the first ten months of 1930

there was a considerable drop in incidence, but it is impossible to say whether or not this may be merely one of the periodic fluctuations which always occurs in contagious diseases.

Diphtheria. The number of cases of diphtheria has shown a very noticeable and steady decline during recent years. This decline is similar to that noticed in certain other sections of the United States where there has been a widespread use of immunization, and we are justified in believing that this procedure is responsible for the decrease of the disease in Montana, also. In 1929 and the first ten months of 1930 the decline in the diphtheria rate in Montana has been truly remarkable. Prior to that time we had seldom dropped below 200 cases reported each year. In 1929, one hundred forty-two cases were reported, and during the first ten months of 1930, only fifty-nine cases have been reported. This decline is much greater than that for the country at large. The state department is co-operating in every way possible with the efforts of local health officers in getting as large a number of children immunized each year as possible. Campaigns of immunization have been put on in many communities in the state and the work is continuing.

Scarlet Fever. In recent years no disease has shown a more radical change in its characteristics than has scarlet fever, the chief changes being a very great decrease in its virulence, with a very great increase in incidence. Probably the increased incidence is due largely to the decrease in virulence, which results in many cases occurring which are never recognized or reported; in fact, many cases occur which do not consult a physician. The case fatality rate has declined from a previous average of over 20 per cent to less than 1 per cent of recognized cases. In 1926 and 1927 more than 2,000 cases were reported each year. Since then there has been a considerable decrease in cases reported to an average of about 1,000 per year.

Measles. The study of the incidence of measles shows that it has waves of incidence which reach epidemic proportions and that these waves occur with remarkable regularity, usually at about three-year intervals. The disease follows this schedule to a considerable extent in Montana. As will be noted from the preceding table, 1929 was what is called a "measles year." The incidence has been low during the first ten months of 1930 and will probably continue through 1931, with a heavy outbreak again in 1932.

Epidemic Meningitis. Prior to 1926 epidemic meningitis had been of rather low incidence in Montana, not more than 15 or 20 cases being reported each year. In 1926, however, a noticeable increase occurred and 42 cases were reported. In 1927 a very great increase occurred when 165 cases were reported. In 1928, one hundred seventy-seven cases were reported, which seemed to be the peak. Since that time there has been a slow and continued decline in cases reported.

Poliomyelitis. This communicable disease continues to show a definite increase throughout the United States and practically every year reaches epidemic proportions in certain sections. In 1928 Montana had

a rather sharp increase in the number of cases and 65 cases were reported. The cases were widely scattered throughout the state. In 1929 only 7 cases were reported and during the first ten months of 1930 only 16 cases have been reported, this in spite of the fact that many of the surrounding states have had serious epidemics.

Spotted Fever. Since spotted fever is the subject of a special report by the State Board of Entomology, it will be mentioned here only to say that the disease seems to show a slow but steady decline in the state. In 1928 thirty-two cases were reported, 20 cases in 1929 and 20 cases in 1930.

Tularaemia. This disease, which is usually contracted by the handling and dressing of infected rabbits and other infected animals, but which also may be contracted by the bite of infected woodticks, was first noticed in Montana in 1924, when four cases were reported. In 1925 and 1926 the number of cases reported averaged about 25 each year. Since then only occasional cases have been reported. In 1928 six cases were reported, in 1929 two cases, and three other cases during the first ten months of 1930.

Psittacosis. This disease, which is primarily an infection in birds and especially in parrots, received a lot of publicity during the latter part of 1929 and the first few months of 1930, when quite a number of cases occurred throughout the United States. In almost every instance the disease was contracted from a sick parrot. Two cases occurred in January, 1930, at Roundup, and apparently were infected from a sick parrot which was received from Chicago a few weeks prior to the onset of the cases. One of the patients died and the other recovered.

THE BIENNIAL REPORT OF THE BUREAU OF VITAL STATISTICS FOR THE YEARS 1928-1929.

L. L. Benepe, Deputy State Registrar.

The Bureau of Vital Statistics was created by the legislature of 1907 and became effective June 1st of that year. It was created for the complete and proper registration of births and deaths for legal, sanitary, and statistical purposes. The Bureau was placed under the immediate superintendence of the Secretary of the State Board of Health, who is State Registrar.

LOCAL REGISTRARS. The health officer of each city or town is local registrar for his immediate district. And when it may appear necessary for the convenience of the people of any locality the state registrar is authorized to appoint any suitable person to act as sub-registrar for the district. Sub-registrars to have the same duties as local registrars, and to make reports direct to the state registrar, and any justice of the peace is required to act as local registrar when requested to do so by the state registrar.

The duties of the local registrar are to collect the birth and death records for his district from the persons responsible for filing them and to check his district at regular intervals to ascertain if all births and deaths occurring in his district are properly filed. On or before the 5th day of each month he shall transmit to the state registrar the original birth and death records collected by him for the previous month, and duplicate records must be filed with the clerk and recorder of the county in which the birth or death occurs. The compensation for the local registrar amounts to twenty-five cents for each certificate filed with the state registrar. A certification of the amount due the local registrar is made at the end of each year by the state registrar to the county treasurers of the various counties.

At the present time there are 107 local registrars in Montana whose names and addresses are as follows: The names are listed in alphabetical order of the counties in which they reside.

| Name | Address | Name | Address |
|-----------------------------|-------------|---------------------------|----------------|
| Dr. F. M. Poindexter..... | Dillon | Mr. R. Hauge..... | Scobey |
| Dr. W. A. Russell..... | Hardin | Dr. M. G. Danskin..... | Glendive |
| Miss Mary Masterson..... | Crow Agency | Mr. N. C. Folger..... | Marsh |
| Mr. Herman Kuper..... | Chinook | Dr. J. L. O'Rourke..... | Anaconda |
| Dr. W. N. Deatherage..... | Harlem | Dr. C. E. K. Vidal..... | Galen |
| Dr. W. L. Lockman..... | Ft. Belknap | Mr. E. E. Dickerson..... | Warm Springs |
| Dr. R. L. Towne..... | Townsend | Dr. W. H. Blakemore..... | Baker |
| Dr. T. J. Benson..... | Fromberg | Mrs. Anna M. Engels..... | Plevna |
| Dr. E. M. Adams..... | Red Lodge | Mr. Wm. Salmon..... | Westmore |
| Dr. G. F. Tidyman..... | Joliet | Dr. J. L. Jenson..... | Denton |
| Dr. J. E. Midgett..... | Bridger | Dr. Hazel Freed..... | Grass Range |
| Dr. B. B. Sandy..... | Ekalaka | Dr. Curtis W. Wilder..... | Lewistown |
| Mrs. Nellie A. Wallace..... | Ridge | Dr. J. R. Soltero..... | Moore |
| Mrs. M. E. Drebert..... | Boyes | Mr. W. E. Jones..... | Roy |
| Dr. F. L. Watkins..... | Great Falls | Dr. W. L. Kell..... | Columbia Falls |
| Dr. Gaylord Worstell..... | Big Sandy | Dr. J. A. Lamb..... | Kalispell |
| Dr. J. Kaulbach..... | Fort Benton | Dr. A. T. Lees..... | Whitefish |
| Dr. W. W. Andrus..... | Miles City | Dr. A. D. Brewer..... | Bozeman |
| Dr. Geo. H. Crary..... | Ismay | Mr. N. M. Kvalnes..... | Three Forks |
| Dr. D. B. Healy..... | Flaxville | Mr. Sam R. Wason..... | Wason Flats |

| Name | Address | Name | Address |
|------------------------|---------------|------------------------|----------------|
| Mr. E. H. Weimer | Cohagen | Mr. Albert Bien | Deer Lodge |
| Mr. W. T. Pollard | Benzien | Mr. Leon B. Clark | Mildred |
| Mrs. Isabelle Haggett | Browning | Mr. W. J. Burton | Terry |
| Dr. P. O. Neraal | Cut Bank | Dr. Herbert Hayward | Hamilton |
| Mr. H. G. Jacobson | Ryegate | Dr. P. S. Rennick | Stevensville |
| Dr. A. C. Knight | Philipsburg | Dr. G. A. Gordan | Hamilton |
| Dr. E. G. Wilcox | Drummond | Dr. A. M. Treat | Fairview |
| Mrs. Margaret J. Allen | Havre | Mr. Chas. Gordon | Wolf Point |
| Miss Julia Hickey | Rocky Boy | Mr. Russell G. Fister | Poplar |
| Mr. J. E. Wild | Boulder | Dr. Guy T. Haywood | Forsyth |
| Mr. S. H. Wolverton | Whitehall | Mrs. Elizabeth Rowland | Lame Deer |
| Dr. A. E. Myrick | Stanford | Dr. E. S. Coats | Plains |
| Mrs. J. A. Raitt | Hobson | Mrs. Arthur Hampton | Noxon |
| Mr. A. C. Retz | Polson | Dr. A. W. Rew | Thompson Falls |
| Mr. M. M. Twichel | St. Ignatius | Mr. A. J. Urquhart | Dooley |
| Dr. Arthur Jordan | Helena | Mr. C. W. Mills | Outlook |
| Mr. F. M. Mack | Augusta | Mr. C. N. Rostad | Westby |
| Dr. B. A. Price | Chester | Mr. Ed Stubbans | Medicine Lake |
| Mrs. Ethel Long | Eureka | Mr. J. G. Debing | Plentywood |
| Dr. C. J. Martin | Libby | Dr. J. J. Kane | Butte |
| Mrs. Alma Storm | Circle | Mr. B. E. Harris | Columbus |
| Dr. R. H. Dyer | Sheridan | Mr. J. A. Lowry | Big Timber |
| Mr. R. G. Wight | White Sulphur | Dr. H. W. Bateman | Choteau |
| Dr. W. J. Doyle | Superior | Dr. M. D. Riddle | Shelby |
| Dr. F. D. Pease | Missoula | Dr. F. M. Alexander | Hysham |
| Dr. C. T. Pigot | Roundup | Mr. Chas. E. Peterson | Glasgow |
| Dr. S. E. Leard | Livingston | Dr. T. L. Cockrell | Hinsdale |
| Miss May Vontver | Winnett | Dr. E. G. Harris | Harlowton |
| Dr. A. N. Currie | Malta | Dr. E. P. Bozarth | Judith Gap |
| Dr. W. L. DuBois | Conrad | Dr. G. E. Keller | Wibaux |
| Dr. C. D. Powell | Valier | Dr. A. E. Stripp | Billings |
| Dr. C. H. James | Broadus | Dr. R. Broughton | Laurel |
| Mrs. Cora Thompson | Sayle | Mr. J. E. Essington | Broadview |

Since 1907 the State Board of Health has made an attempt to collect all the records of births and deaths occurring within the state, with a steady increase in both categories, as the persons connected with the gathering of the material in the field have become familiar with the work. For the past ten years there have been registered approximately 5,000 deaths and 10,000 births annually.

It is the function of the Bureau of Vital Statistics to promote the accurate and complete registration of the birth and death records, to properly index file and preserve them, to furnish certified copies of any records, to supply the Census Bureau at Washington, D. C. with transcripts, to tabulate and study the records, so that they may be of the greatest possible value in improving health conditions in the state and to forward to all parents a birth notification stating that their baby's birth is properly recorded in the files of the State Board of Health and included with this notification is the Bulletin "Infant Care".

Wishing to determine the value of the bulletin to parents the following note has been inserted in each bulletin during the past five months:

"This bulletin on Infant Care is published by the Children's Bureau at Washington. That Bureau furnishes free to Montana three thousand of these bulletins per year. The Child Welfare Division of the State Board of Health purchases, from the Children's Bureau about sixty-six hundred of these per year at a cost of over five hundred dollars.

When a birth is reported to the State Board of Health the mother of the child is sent this bulletin. I would like to know

whether or not this bulletin is of value to you. An expression of opinion will be appreciated."

Yours very truly,

W. F. COGSWELL, M. D.,
Special Agent, Census Bureau,
Helena, Montana."

Inserted are three representative letters which have been received in reply and which indicate that the expense of the bulletin and the additional time consumed in mailing it are well spent.

"Dear Doctor Cogswell:

In regard to the bulletin on "Infant Care" I must say that it is just what every mother needs especially a young mother with her first baby. I know from past experience that this same booklet would have proved an invaluable one to me when I had my first baby to care for and no experience to rely on. Hoping that other mothers find this book valuable as I do.

Sincerely yours,"

"Dear Sir:

In regard to the bulletin on Infant's care I really was glad to receive it; as there were several things that I was not certain was proper for the baby. Such as when the baby would be old enough for orange juice, and if tomato juice was given. In just the little while that I've had this bulletin I have referred to it at least once every day. I really think it is a great help and very much appreciated by the young mothers such as I. Although we can get some help from our mothers and elders but when they raised their children they did not use modern methods in any form. Even my own mother said that her children never had a drop of orange juice in their lives, nor cod-liver oil. You may rest assured that at least I value the bulletin highly and wish to thank you ever so much for it.

Sincerely,"

"Dear Sir:

I wish to thank you for the book "Infant Care" which you sent recently, with the baby's birth certificate.

I had a 1926 publication of the same bulletin and nearly wore it out while getting my little girl through babyhood, and was using it again for this one. This last publication is even better than the other and I refer to it for something almost every day. It is, indeed, a wonderful help to mothers. I know of several women here who value it as much as I do.

Very sincerely,"

In countless ways the keeping of accurate records of the two most important events in the lives of the people is proving of great importance for social, political, economic, and health benefits of the citizens. Estates may be lost and insurance withheld because proof of death cannot be shown; passports, labor and school permits withheld because proof of age cannot be shown.

The check kept of the number of times the records of the office were searched and information sent out show 3,810 for 1928 and 4,794 for 1929, an increase of 984 instances which is 25.8% or one-fourth increase in research work in one year.

Montana was admitted to the United States registration area for deaths in 1910. That year we proved to the federal authorities that we

were registering over 90% of the deaths occurring in the state. Satisfactory birth reporting was not reached until about 1919. In 1921 this office requested the United States Census Bureau to make a birth check, so that we might enter the Birth Registration Area. A check was made of the months of July and August of that year which indicated that we were recording 93.4% of the births. We were accordingly admitted as the twenty-fourth state in the United States Registration Area on January 1, 1922. Checks made by this office since then indicate that we are now receiving over 98% of the deaths and 95% of the births occurring in the state.

Table I below is inserted to show the number of births and deaths reported, the excess of births over deaths and the vital index (i. e., 100 Births/Deaths for the years 1908 through 1929).

TABLE I
THE NUMBER OF BIRTHS AND DEATHS IN MONTANA 1908-1929. THE EXCESS OF BIRTHS OVER DEATHS AND THE VITAL INDEX.

| Year | Births | Deaths | Excess Births Over Deaths | Vital Index |
|---|---------|--------|---------------------------------|----------------|
| December, 1907, through November, 1908..... | 5,842 | 4,353 | 511 | 134.2 |
| July 1, 1908, to June 30, 1909..... | 6,021 | 4,241 | 1,780 | 142.0 |
| July 1, 1909, to June 30, 1910..... | 6,294 | 3,911 | 2,383 | 160.9 |
| Calendar Year | | | | |
| 1910..... | 6,124 | 3,996 | 2,128 | 153.2 |
| 1911..... | 7,542 | 4,006 | 3,536 | 188.2 |
| 1912..... | 8,133 | 4,397 | 3,736 | 185.0 |
| 1913..... | 8,682 | 5,098 | 3,584 | 170.3 |
| 1914..... | 9,969 | 5,048 | 4,921 | 197.5 |
| 1915..... | 11,132 | 5,242 | 5,890 | 212.3 |
| 1916..... | 11,300* | 5,483 | 5,817 | 206.0 |
| 1917..... | 11,600* | 6,421 | 5,179 | 180.6 |
| 1918..... | 11,800* | 8,985 | 2,815 | 131.3** |
| 1919..... | 12,017 | 5,786 | 6,231 | 207.7 |
| 1920..... | 11,862 | 5,289 | 6,573 | 224.2 |
| 1921..... | 12,127 | 4,693 | 7,438 | 258.4 |
| 1922..... | 11,060 | 5,106 | 5,954 | 216.6 |
| 1923..... | 10,524 | 4,914 | 5,615 | 214.4 |
| 1924..... | 10,283 | 4,991 | 5,292 | 206.0 |
| 1925..... | 10,302 | 5,103 | 5,199 | 201.9 |
| 1926..... | 10,008 | 5,375 | 4,633 | 186.1 |
| 1927..... | 9,875 | 5,185 | 4,690 | 190.0 |
| 1928..... | 10,072 | 5,812 | 4,260 | 173.3 |
| 1929..... | 10,080 | 5,748 | 4,332 | 175.4 |

* Estimated.

** Flu year.

It will be noted from this table that the death reporting became accurate far more rapidly than did the birth reporting. There was a constant increase in birth reporting up to 1921 while the death reports remained almost constant from 1913 up to 1929 except for the influenza year. The Vital Index column indicates that there were over twice as many births registered during the years 1919 through 1925 while there has been a slight decrease in this ratio for the past four years, due to an increase in the number of deaths and a decrease in the number of births.

POPULATION

Montana showed a decrease of 11,283 in population in the Census of 1930 compared to the Census ten years previous. The following table gives the population by counties and the six cities over 10,000 population for 1920 and 1930 the increase or decrease and the percentage of increase or decrease.

TABLE II

MONTANA'S POPULATION BY COUNTIES AND PRINCIPAL CITIES, THE GAIN OR LOSS AND THE PERCENTAGE GAIN OR LOSS FOR EACH AS DETERMINED BY THE FEDERAL CENSUSES OF 1920 AND 1930.

| County or City | | 1930 | 1920 | Increase, 1920-1930* Number | Per Cent |
|--------------------------|-------|---------|------------------------------------|--------------------------------|----------|
| State | Total | 537,606 | 548,889 | 11,283 | -2.1 |
| By Counties: | | | | | |
| Beaverhead | | 6,654 | 7,369 | -715 | -9.7 |
| Big Horn | | 8,543 | 7,015 | 1,528 | 21.8 |
| Blaine | | 9,006 | 9,057 | -51 | -0.16 |
| Broadwater | | 2,738 | 3,239 | -501 | -15.5 |
| Carbon** | | 12,571 | 15,279 | -2,708 | -17.7 |
| Carter | | 4,136 | 3,972 | 164 | 4.1 |
| Cascade | | 41,146 | 38,836 | 2,310 | 5.9 |
| Chouteau** | | 8,635 | 11,051 | -2,416 | -21.9 |
| Custer | | 11,242 | 12,194 | -952 | -7.8 |
| Daniels*** | | 5,553 | Created from Sheridan and Valley | | |
| Dawson | | 9,881 | 9,239 | 642 | 6.9 |
| Deer Lodge | | 16,293 | 15,323 | 970 | 6.3 |
| Fallon | | 4,568 | 4,548 | 20 | 0.4 |
| Fergus** | | 16,531 | 28,344 | -11,813 | -41.7 |
| Flathead** | | 19,200 | 21,705 | -2,505 | -11.5 |
| Gallatin | | 16,124 | 15,864 | 260 | 1.6 |
| Garfield | | 4,252 | 5,368 | -1,116 | -20.8 |
| Glacier | | 5,297 | 4,178 | 1,119 | 26.8 |
| Golden Valley*** | | 2,116 | Created from Musl. and Sweet Grass | | |
| Granite | | 3,013 | 4,167 | -1,154 | -27.7 |
| Hill | | 13,775 | 13,958 | -183 | -1.3 |
| Jefferson | | 4,133 | 5,203 | -1,070 | -20.6 |
| Judith Basin** | | 5,238 | Created from Fergus and Cascade | | |
| Lake*** | | 9,541 | Created from Flathead and Missoula | | |
| Lewis & Clark | | 18,224 | 18,660 | -436 | -2.3 |
| Liberty | | 2,198 | 2,416 | -218 | -9.0 |
| Lincoln | | 7,089 | 7,797 | -709 | -9.1 |
| McCone | | 4,790 | 4,747 | 43 | 0.9 |
| Madison | | 6,323 | 7,495 | -1,172 | -15.6 |
| Meagher | | 2,272 | 2,622 | -350 | -13.3 |
| Mineral | | 1,626 | 2,327 | -701 | -30.1 |
| Missoula** | | 21,782 | 24,041 | -2,259 | -9.4 |
| Musselshell** | | 7,242 | 12,030 | -4,788 | -39.8 |
| Park | | 10,922 | 11,330 | -408 | -3.6 |
| Petroleum*** | | 2,045 | Created from Fergus | | |
| Phillips | | 8,208 | 9,311 | -1,103 | -11.8 |
| Pondera | | 6,964 | 5,741 | 1,223 | 21.3 |
| Powder River | | 3,909 | 3,357 | 552 | 16.4 |
| Powell | | 6,202 | 6,909 | -707 | -10.2 |
| Prairie | | 3,941 | 3,684 | 257 | 7.0 |
| Ravalli | | 10,315 | 10,098 | 217 | 2.1 |
| Richland | | 9,633 | 8,989 | 644 | 7.2 |
| Roosevelt | | 10,672 | 10,347 | 325 | 3.1 |
| Rosebud | | 7,347 | 8,002 | -655 | -8.2 |
| Sanders | | 5,692 | 4,903 | 789 | 16.1 |
| Sheridan** | | 9,869 | 13,847 | -3,978 | -28.7 |
| Silver Bow | | 56,969 | 60,313 | -3,344 | -5.5 |
| Stillwater | | 6,253 | 7,630 | -1,377 | -18.0 |
| Sweet Grass** | | 3,944 | 4,926 | -982 | -19.9 |
| Teton | | 6,068 | 5,870 | 198 | 3.4 |
| Toole | | 6,714 | 3,724 | 2,990 | 80.3 |
| Treasure | | 1,661 | 1,990 | -329 | -16.5 |
| Valley** | | 11,181 | 11,542 | -361 | -3.1 |
| Wheatland | | 3,751 | 5,619 | -1,868 | -33.2 |
| Wibaux | | 2,767 | 3,113 | -346 | -11.1 |
| Yellowstone | | 30,785 | 29,600 | 1,185 | 4.0 |
| Principal Cities: | | | | | |
| Anaconda | | 12,494 | 11,668 | 826 | 7.1 |
| Billings | | 16,380 | 15,100 | 1,280 | 8.5 |
| Butte | | 39,532 | 41,611 | -2,079 | -5.0 |
| Great Falls | | 28,822 | 24,121 | 4,701 | 19.5 |
| Helena | | 11,803 | 12,037 | -234 | -1.9 |
| Missoula | | 14,657 | 12,668 | 1,989 | 15.7 |

* A minus sign (-) denotes decrease.

** Change in area since 1920.

*** New county formed since 1920.

**CENSUS FIGURES FOR CITIES AND TOWNS OVER 500 POPULATION
IN MONTANA 1930.**

| Rank | City | Pop. | Rank | City | Pop. |
|------|-------------|--------|------|----------------|-------|
| 1 | Butte | 39,532 | 38 | Klein | 1,177 |
| 2 | Great Falls | 28,822 | 39 | Browning | 1,172 |
| 3 | Billings | 16,380 | 40 | Hardin | 1,169 |
| 4 | Missoula | 14,657 | 41 | Fort Benton | 1,109 |
| 5 | Anaconda | 12,494 | 42 | Poplar | 1,046 |
| 6 | Helena | 11,803 | 43 | East Helena | 1,039 |
| 7 | Miles City | 7,175 | 44 | Boulder | 926 |
| 8 | Bozeman | 6,855 | 45 | Choteau | 926 |
| 9 | Livingston | 6,391 | 46 | Three Forks | 884 |
| 10 | Havre | 6,372 | 47 | Eureka | 860 |
| 11 | Kalispell | 6,094 | 48 | Cut Bank | 845 |
| 12 | Lewistown | 5,358 | 49 | Columbus | 834 |
| 13 | Glendive | 4,629 | 50 | Belt | 810 |
| 14 | Deer Lodge | 3,510 | 51 | Terry | 779 |
| 15 | Red Lodge | 3,026 | 52 | Townsend | 735 |
| 16 | Whitefish | 2,803 | 53 | Harlem | 708 |
| 17 | Roundup | 2,577 | 54 | Stevensville | 692 |
| 18 | Laurel | 2,558 | 55 | Twin Bridges | 671 |
| 19 | Dillon | 2,422 | 56 | Columbia Falls | 637 |
| 20 | Glasgow | 2,216 | 57 | Big Sandy | 633 |
| 21 | Walkerville | 2,052 | 58 | Wibaux | 619 |
| 22 | Sidney | 2,010 | 59 | Fairview | 576 |
| 23 | Shelby | 2,004 | 60 | Valier | 575 |
| 24 | Hamilton | 1,839 | 61 | White Sulphur | 575 |
| 25 | Libby | 1,752 | 62 | Bridge | 567 |
| 26 | Forsyth | 1,591 | 63 | Whitehall | 553 |
| 27 | Wolf Point | 1,539 | 64 | Ronan | 537 |
| 28 | Conrad | 1,499 | 65 | Culbertson | 536 |
| 29 | Harlowton | 1,473 | 66 | Belgrade | 533 |
| 30 | Polson | 1,455 | 67 | Plains | 522 |
| 31 | Malta | 1,342 | 68 | Sheridan | 521 |
| 32 | Chinook | 1,320 | 69 | Circle | 519 |
| 33 | Philipsburg | 1,300 | 70 | Cascade | 512 |
| 34 | Scobey | 1,259 | 71 | Stanford | 509 |
| 35 | Plentywood | 1,223 | 72 | Saco | 506 |
| 36 | Big Timber | 1,221 | 73 | Manhattan | 501 |
| 37 | Baker | 1,212 | | | |

DEATHS 1928.

In 1928 there were 5,812 deaths reported, giving a death rate of 10.8 per 1,000 of population. This is the largest number of deaths to be reported to the State Board of Health in any year since the influenza pandemic of 1918 when 8,985 deaths were registered. The excess of deaths in 1928 may be attributed to the large number from influenza deaths received in the months of November and December of that year and the increase in complicating pulmonary diseases.

The counties showing the highest death rates were Deer Lodge* (23.6), Silver Bow (16.9) and Lewis & Clark** (16.1). Those showing the lowest were Garfield (2.8), Prairie (3.6) and Judith Basin (4.0). (See Table III following).

DEATHS 1929.

The 1929 deaths reported amounted to 5,748 and the death rate per 1,000 of population 10.7, and amounted to the fourth largest number of deaths to be reported to the State Board of Health since 1918. More deaths were registered in 1918, 1928 and 1919 in the order given. The counties having the highest death rates in 1929 were, Deer Lodge* (23.0), Silver Bow (17.7) and Lewis & Clark** (15.4). Those having the lowest were Liberty (1.8), Judith Basin (2.7) and Garfield and Golden Valley (3.8) each. (See Table IV following).

* Includes deaths from State Hospital and State Tuberculosis Sanitarium.

** Includes deaths from United States Veterans Hospital.

BIRTHS 1928.

There were 10,072 births reported in 1928 and the birth rate was 18.7 per 1,000 of population. This is 197 more than were reported in 1927, which was the only year that fewer than 10,000 births have been registered with the State Board of Health since 1919. The counties having the highest birth rates were Roosevelt (28.7), Fallon (28.5) and Big Horn (27.0). Those having the lowest rates were Granite (7.0), Judith Basin (8.0) and Meagher (8.4). (See Table V following).

BIRTHS 1929.

The number of 1929 births reported were almost exactly the same as in 1928, exceeding the former year by 8 making a total of 10,080 and the rate per 1,000 of population was the same as the previous year which was 18.7. The counties having the highest birth rates in 1929 were Roosevelt (29.1), Glacier (27.6), with Daniels and Hill 26.3 each while those having the lowest rates were Mineral (3.7), Judith Basin (5.2) and Jefferson (8.0). (See Table VI following).

The death rates in the United States Registration area for 1928 and 1929 were 12.1 and 11.9 respectively. Montana's death rate for those years was 10.8 and 10.7. The Montana rates were 1.3 per 1,000 lower in 1928 and 1.2 lower in 1929.

For the births the Registration Area rate in 1928 was 19.7 per 1,000 and in 1929 it was 18.9. For Montana the birth rate was 18.7 for both years. The Montana rate was 1.0 lower in 1928 and 0.2 per 1,000 lower in 1929.

TABLE III

1928 DEATHS BY COUNTIES, MONTHS AND RATE PER 1,000 OF POPULATION

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total | Rate per 1,000 |
|--------------------------|------|------|-------|-------|-----|------|------|------|-------|------|------|------|-------|----------------|
| Montana (State Total)... | 452 | 456 | 511 | 502 | 466 | 443 | 460 | 427 | 409 | 462 | 546 | 678 | 5812 | 10.8 |
| COUNTIES | | | | | | | | | | | | | | |
| Beaverhead..... | 4 | 4 | 5 | 6 | 4 | 6 | 6 | 6 | 8 | 7 | 5 | 2 | 63 | 9.5 |
| Big Horn..... | 7 | 11 | 10 | 7 | 8 | 7 | 10 | 6 | 4 | 6 | 5 | 8 | 89 | 10.4 |
| Blaine..... | 6 | 11 | 7 | 8 | 2 | 8 | 6 | 11 | 2 | 4 | 6 | 8 | 79 | 8.9 |
| Broadwater..... | 2 | 1 | 1 | 1 | 1 | 1 | 4 | 2 | 2 | 2 | 4 | ... | 20 | 7.3 |
| Carbon..... | 12 | 7 | 15 | 7 | 14 | 9 | 7 | 6 | 6 | 8 | 10 | 9 | 110 | 8.7 |
| Carter..... | 1 | 1 | 1 | 1 | 2 | 4 | 2 | ... | ... | ... | 5 | 2 | 18 | 4.4 |
| Cascade..... | 34 | 51 | 32 | 31 | 32 | 43 | 37 | 42 | 23 | 29 | 38 | 53 | 445 | 10.8 |
| Chouteau..... | 5 | 3 | 6 | 8 | 6 | 10 | 3 | 1 | 6 | 3 | 4 | 5 | 60 | 7.0 |
| Custer..... | 8 | 14 | 12 | 19 | 13 | 9 | 13 | 16 | 14 | 12 | 10 | 16 | 156 | 13.9 |
| Daniels..... | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 3 | 9 | 3 | 2 | 6 | 40 | 7.2 |
| Dawson..... | 9 | 2 | 6 | 6 | 12 | 6 | 7 | 6 | 5 | 11 | 11 | 16 | 97 | 9.8 |
| Deer Lodge..... | 24 | 23 | 41 | 40 | 30 | 23 | 40 | 26 | 24 | 27 | 35 | 51 | 384 | 23.6 |
| Fallon..... | 3 | 1 | 4 | 2 | 3 | ... | 1 | ... | ... | 6 | 3 | 3 | 26 | 5.7 |
| Fergus..... | 18 | 14 | 16 | 14 | 19 | 12 | 9 | 10 | 11 | 10 | 13 | 11 | 157 | 9.5 |
| Flathead..... | 8 | 12 | 13 | 16 | 18 | 17 | 14 | 10 | 17 | 12 | 18 | 22 | 177 | 9.2 |
| Gallatin..... | 16 | 19 | 10 | 13 | 25 | 14 | 7 | 18 | 9 | 8 | 20 | 27 | 186 | 11.5 |
| Garfield..... | ... | 1 | 2 | ... | 1 | 1 | ... | 1 | 1 | 2 | ... | 3 | 12 | 2.8 |
| Glacier..... | 6 | ... | ... | 12 | 9 | 1 | 11 | 4 | 3 | 4 | 8 | 13 | 79 | 14.9 |
| Golden Valley..... | 1 | 2 | 5 | 1 | 1 | 3 | ... | 2 | 1 | 1 | 1 | 3 | 21 | 9.9 |
| Granite..... | 1 | 6 | 2 | ... | 4 | 2 | 3 | 1 | 1 | 8 | 3 | 9 | 40 | 13.3 |
| Hill..... | 20 | 6 | 10 | 17 | 10 | 8 | 14 | 7 | 13 | 15 | 11 | 28 | 159 | 11.4 |
| Jefferson..... | 3 | 4 | 6 | 5 | 5 | 4 | 6 | 4 | 1 | ... | 5 | 3 | 46 | 11.1 |
| Judith Basin..... | 1 | 2 | 4 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | ... | 3 | 21 | 4.0 |
| Lake..... | 5 | 11 | 4 | 7 | 6 | 3 | 6 | 12 | 3 | 11 | 8 | 22 | 98 | 10.3 |
| Lewis & Clark..... | 19 | 34 | 21 | 29 | 20 | 21 | 28 | 19 | 17 | 22 | 33 | 32 | 295 | 16.1 |
| Liberty..... | 2 | 3 | 1 | ... | ... | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 15 | 6.8 |
| Lincoln..... | 2 | 4 | 1 | 4 | 4 | 4 | 6 | 7 | 4 | 5 | 4 | 5 | 50 | 7.1 |
| McCone..... | ... | 2 | 2 | 4 | 2 | 1 | 7 | 1 | 1 | 3 | 3 | 1 | 27 | 5.6 |
| Madison..... | 4 | 4 | ... | 5 | ... | 7 | 5 | 4 | 3 | 3 | 8 | 10 | 53 | 8.4 |
| Meagher..... | 3 | ... | 1 | 2 | 2 | ... | ... | 1 | 2 | 2 | 1 | ... | 14 | 6.2 |
| Mineral..... | 2 | 1 | 2 | ... | 1 | 1 | 1 | 4 | 3 | 1 | ... | 2 | 18 | 11.1 |
| Missoula..... | 19 | 21 | 27 | 24 | 20 | 21 | 26 | 20 | 21 | 29 | 33 | 35 | 296 | 13.6 |
| Musselshell..... | 8 | 6 | 4 | 5 | 6 | 2 | 5 | 7 | 6 | 2 | 7 | 8 | 66 | 9.1 |
| Park..... | 10 | 9 | 10 | 5 | 13 | 11 | 5 | 3 | 10 | 15 | 11 | 16 | 118 | 10.8 |
| Petroleum..... | ... | ... | 3 | ... | 2 | 1 | 3 | 2 | 1 | 1 | ... | 2 | 15 | 7.8 |
| Phillips..... | 1 | 1 | 5 | 4 | 4 | 6 | 4 | 7 | 4 | 8 | 2 | 9 | 55 | 6.7 |
| Pondera..... | 1 | 3 | 3 | 6 | 4 | 5 | 3 | 4 | 1 | 6 | 4 | 6 | 46 | 6.6 |
| Powder River..... | 1 | ... | 2 | 2 | 2 | 3 | ... | ... | 1 | 3 | ... | 2 | 16 | 4.1 |
| Powell..... | 4 | ... | 5 | 4 | 4 | 3 | 5 | 3 | 4 | 5 | 6 | 8 | 51 | 8.2 |
| Prairie..... | ... | ... | 2 | 2 | 2 | 1 | 2 | ... | 1 | ... | ... | 4 | 14 | 3.6 |
| Ravalli..... | 9 | 9 | 10 | 12 | 10 | 6 | 6 | 12 | 7 | 9 | 9 | 8 | 107 | 10.4 |
| Richland..... | 2 | 2 | 9 | 6 | 8 | 5 | 4 | 2 | 3 | 3 | 3 | 5 | 52 | 5.4 |
| Roosevelt..... | 9 | ... | 12 | 10 | 7 | 9 | 9 | 4 | 7 | 4 | 10 | 22 | 103 | 9.6 |
| Rosebud..... | 6 | 8 | 12 | 7 | 2 | 8 | 7 | 13 | 8 | 12 | 3 | 5 | 91 | 12.4 |
| Sanders..... | ... | 4 | 4 | 2 | 2 | 2 | 2 | 4 | 3 | 4 | 4 | 4 | 35 | 6.2 |
| Sheridan..... | 8 | 6 | 3 | 3 | 8 | 4 | 6 | 5 | 6 | 7 | 4 | 4 | 64 | 6.5 |
| Silver Bow..... | 92 | 84 | 93 | 88 | 61 | 75 | 63 | 52 | 78 | 61 | 123 | 90 | 960 | 16.9 |
| Stillwater..... | 3 | 3 | 4 | 2 | 4 | 6 | 6 | 3 | ... | 6 | 3 | 6 | 46 | 7.4 |
| Sweet Grass..... | 2 | 4 | 5 | 4 | 1 | 2 | 1 | 2 | 5 | 1 | 1 | 5 | 33 | 8.4 |
| Teton..... | 4 | 3 | 3 | 9 | 2 | 5 | 4 | 1 | 2 | ... | 3 | 10 | 46 | 7.6 |
| Toole..... | 2 | 1 | 2 | 4 | 3 | 5 | 6 | 5 | 9 | 7 | 4 | 1 | 49 | 7.3 |
| Treasure..... | 1 | ... | 2 | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | 7 | 4.2 |
| Valley..... | 6 | 1 | 11 | 4 | 9 | 4 | 4 | 7 | 7 | 10 | 12 | 11 | 86 | 7.7 |
| Wheatland..... | 2 | ... | 4 | 4 | 2 | 1 | ... | 1 | 2 | 5 | 4 | 4 | 29 | 7.7 |
| Wibaux..... | 1 | ... | 2 | ... | ... | ... | 2 | 2 | 4 | ... | 1 | 5 | 17 | 6.1 |
| Yellowstone..... | 32 | 31 | 28 | 27 | 32 | 28 | 28 | 33 | 22 | 37 | 24 | 33 | 355 | 11.5 |

TABLE IV

1929 DEATHS BY COUNTIES & MONTHS AND RATE PER 1,000 OF POPULATION

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total | Rate per 1,000 |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------|
| Montana (State Total)... | 567 | 454 | 502 | 512 | 538 | 455 | 441 | 425 | 460 | 486 | 442 | 466 | 5748 | 10.7 |
| COUNTIES | | | | | | | | | | | | | | |
| Beaverhead..... | 6 | 7 | 7 | 5 | 6 | 6 | 6 | 6 | 5 | 3 | 5 | 6 | 68 | 10.2 |
| Big Horn..... | 6 | 9 | 7 | 14 | 7 | 7 | 6 | 6 | 6 | 11 | 8 | 4 | 91 | 10.7 |
| Blaine..... | 3 | 5 | 8 | 7 | 4 | 3 | 8 | 6 | 7 | 2 | 9 | 2 | 64 | 7.1 |
| Broadwater..... | 3 | 1 | 1 | 2 | 1 | 2 | 3 | 6 | 3 | 2 | 1 | 1 | 25 | 9.1 |
| Carbon..... | 10 | 13 | 9 | 4 | 11 | 5 | 5 | 7 | 6 | 8 | 4 | 5 | 87 | 6.9 |
| Carter..... | 2 | 3 | 3 | 8 | 8 | 6 | 2 | 1 | 1 | 1 | 1 | 1 | 27 | 6.5 |
| Cascade..... | 33 | 44 | 29 | 49 | 41 | 31 | 47 | 21 | 32 | 52 | 30 | 37 | 446 | 10.8 |
| Chouteau..... | 5 | 6 | 6 | 6 | 3 | 3 | 5 | 6 | 4 | 5 | 5 | 5 | 54 | 6.3 |
| Custer..... | 17 | 4 | 10 | 12 | 14 | 6 | 15 | 14 | 17 | 15 | 7 | 15 | 146 | 13.0 |
| Daniels..... | 5 | 6 | 2 | 6 | 4 | 5 | 8 | 5 | 2 | 1 | 3 | 1 | 48 | 8.6 |
| Dawson..... | 15 | 5 | 8 | 6 | 9 | 7 | 7 | 7 | 6 | 8 | 7 | 3 | 88 | 8.9 |
| Deer Lodge..... | 35 | 25 | 38 | 35 | 36 | 41 | 31 | 27 | 32 | 28 | 30 | 18 | 376 | 23.0 |
| Fallon..... | 2 | 2 | 2 | 2 | 1 | 4 | 2 | 4 | 3 | 3 | 2 | 1 | 28 | 6.1 |
| Fergus..... | 11 | 14 | 10 | 13 | 13 | 8 | 6 | 8 | 11 | 10 | 13 | 16 | 133 | 8.0 |
| Flathead..... | 18 | 16 | 17 | 26 | 19 | 17 | 16 | 16 | 18 | 21 | 17 | 25 | 226 | 11.8 |
| Gallatin..... | 14 | 14 | 14 | 9 | 19 | 15 | 13 | 11 | 22 | 7 | 6 | 20 | 164 | 10.2 |
| Garfield..... | 4 | 2 | 2 | ..... | 1 | 1 | 1 | 1 | 1 | 3 | 1 | ..... | 16 | 3.8 |
| Glacier..... | 4 | 7 | 17 | 5 | 8 | 2 | 6 | 8 | 3 | 6 | 2 | 2 | 70 | 13.2 |
| Golden Valley..... | ..... | 1 | 1 | ..... | 1 | 1 | ..... | 2 | ..... | 1 | 1 | 1 | 8 | 3.8 |
| Granite..... | 4 | 2 | ..... | 5 | 1 | 1 | 2 | 4 | 1 | 1 | 4 | 1 | 26 | 8.6 |
| Hill..... | 17 | 6 | 9 | 11 | 13 | 10 | 10 | 19 | 9 | 14 | 15 | 12 | 145 | 10.5 |
| Jefferson..... | 6 | 1 | 5 | 5 | 4 | 1 | 5 | 5 | 3 | 4 | 2 | 5 | 46 | 11.1 |
| Judith Basin..... | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | ..... | 2 | 1 | 1 | 14 | 2.7 |
| Lake..... | 13 | 10 | 7 | 7 | 9 | 11 | 5 | 5 | 6 | 5 | 7 | 12 | 97 | 10.2 |
| Lewis & Clark..... | 29 | 33 | 27 | 16 | 20 | 22 | 16 | 19 | 23 | 24 | 28 | 24 | 281 | 15.4 |
| Liberty..... | ..... | 1 | ..... | ..... | ..... | ..... | 1 | ..... | 1 | ..... | 1 | ..... | 4 | 1.8 |
| Lincoln..... | 8 | 3 | 7 | 5 | 5 | 4 | 2 | 3 | 3 | 9 | 3 | 1 | 53 | 7.5 |
| McCone..... | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 2 | 21 | 4.4 |
| Madison..... | 3 | 4 | 1 | 2 | 4 | 1 | 2 | 3 | 7 | 3 | 5 | 3 | 38 | 6.0 |
| Meagher..... | 2 | 2 | 1 | ..... | 1 | ..... | 1 | 1 | 1 | 1 | 2 | 3 | 15 | 6.6 |
| Mineral..... | ..... | 2 | 1 | 2 | ..... | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 13 | 8.0 |
| Missoula..... | 13 | 26 | 29 | 24 | 37 | 25 | 18 | 21 | 16 | 26 | 21 | 28 | 284 | 13.0 |
| Musselshell..... | 6 | 3 | 11 | 5 | 4 | 1 | 8 | 3 | 8 | 4 | 2 | 10 | 65 | 9.0 |
| Park..... | 6 | 13 | 11 | 9 | 6 | 8 | 10 | 7 | 13 | 6 | 8 | 8 | 105 | 9.6 |
| Petroleum..... | 1 | ..... | 1 | 1 | 1 | 1 | 3 | ..... | 2 | 1 | 3 | 1 | 13 | 6.4 |
| Phillips..... | 6 | 2 | 4 | 4 | 5 | 6 | 1 | 4 | 1 | 6 | 10 | 6 | 55 | 6.7 |
| Pondera..... | 7 | 4 | 6 | 12 | 10 | 3 | 2 | 5 | 9 | 4 | 5 | 6 | 73 | 10.5 |
| Powder River..... | ..... | 1 | 1 | 4 | 1 | 1 | 3 | 1 | 2 | 1 | ..... | 1 | 16 | 4.1 |
| Powell..... | 8 | 4 | 4 | 6 | 4 | 2 | 4 | 6 | 8 | 3 | 3 | 5 | 57 | 9.2 |
| Prairie..... | 2 | ..... | 4 | 1 | 1 | 2 | 2 | 4 | 1 | ..... | 3 | 1 | 21 | 5.3 |
| Ravalli..... | 1 | 13 | 12 | 10 | 5 | 13 | 9 | 10 | 5 | 6 | 11 | 7 | 102 | 9.9 |
| Richland..... | 11 | 1 | 3 | 7 | 5 | 9 | 4 | 5 | 4 | 6 | 3 | 4 | 62 | 6.4 |
| Roosevelt..... | 32 | 14 | 8 | 11 | 14 | 11 | 10 | 12 | 8 | 10 | 8 | 5 | 143 | 13.4 |
| Rosebud..... | 12 | 7 | 5 | 12 | 9 | 6 | 6 | 8 | 5 | 4 | 7 | 3 | 84 | 11.4 |
| Sanders..... | 7 | 5 | 4 | 2 | 2 | ..... | 6 | 4 | 6 | 3 | 6 | 4 | 49 | 8.6 |
| Sheridan..... | 9 | 2 | 5 | 3 | 7 | 5 | 5 | 7 | 8 | 9 | 4 | 7 | 71 | 7.2 |
| Silver Bow..... | 108 | 55 | 79 | 96 | 110 | 82 | 74 | 64 | 77 | 93 | 81 | 91 | 1010 | 17.7 |
| Stillwater..... | 6 | 2 | 5 | 7 | 7 | 8 | 2 | 5 | 2 | 4 | 4 | 2 | 54 | 8.6 |
| Sweet Grass..... | 3 | 5 | 6 | 4 | 1 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 36 | 9.1 |
| Teton..... | 5 | 2 | 4 | 4 | 1 | 8 | 2 | 6 | 4 | 4 | 7 | 8 | 55 | 9.1 |
| Toole..... | 9 | 4 | 6 | 2 | 2 | 1 | 3 | 5 | ..... | 4 | 3 | 2 | 41 | 6.1 |
| Treasure..... | ..... | ..... | 1 | 1 | 1 | 3 | ..... | ..... | ..... | ..... | 3 | 9 | 5.4 | |
| Valley..... | 10 | 8 | 5 | 3 | 12 | 6 | 4 | 2 | 2 | 3 | 3 | 6 | 64 | 5.7 |
| Wheatland..... | ..... | 1 | 6 | 4 | 1 | 2 | 3 | 3 | 2 | 1 | 1 | 2 | 26 | 6.9 |
| Wibaux..... | 2 | 1 | 1 | ..... | ..... | 3 | 3 | ..... | 2 | 1 | 2 | 2 | 17 | 6.1 |
| Yellowstone..... | 23 | 30 | 31 | 20 | 29 | 29 | 18 | 20 | 36 | 31 | 28 | 23 | 318 | 10.3 |

TABLE V.

1928 BIRTHS BY COUNTIES & MONTHS AND RATE PER 1,000 OF POPULATION

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total | Rate per 1,000 |
|-----------------------|------|------|-------|-------|-----|------|------|------|-------|------|------|------|-------|-------------------|
| Montana (State Total) | 794 | 782 | 920 | 839 | 911 | 858 | 866 | 869 | 858 | 837 | 730 | 808 | 10072 | 18.7 |
| COUNTIES | | | | | | | | | | | | | | |
| Beaverhead | 2 | 10 | 7 | 9 | 9 | 5 | 5 | 7 | 9 | 6 | 4 | 5 | 78 | 11.8 |
| Big Horn | 15 | 13 | 20 | 14 | 28 | 19 | 27 | 24 | 17 | 16 | 18 | 19 | 230 | 27.0 |
| Blaine | 13 | 19 | 15 | 16 | 20 | 14 | 10 | 17 | 14 | 18 | 13 | 28 | 197 | 21.9 |
| Broadwater | 2 | 4 | 1 | 4 | 5 | 1 | 5 | 1 | 4 | 2 | 1 | 3 | 33 | 12.1 |
| Carbon | 18 | 17 | 22 | 19 | 34 | 27 | 22 | 16 | 17 | 13 | 21 | 13 | 239 | 19.0 |
| Carter | 5 | 10 | 2 | 4 | 1 | 6 | 5 | 7 | 3 | 6 | 4 | 4 | 57 | 13.8 |
| Cascade | 68 | 65 | 82 | 84 | 95 | 78 | 76 | 72 | 79 | 74 | 69 | 81 | 923 | 22.4 |
| Chouteau | 10 | 11 | 9 | 5 | 9 | 13 | 11 | 7 | 8 | 11 | 2 | 12 | 108 | 12.6 |
| Custer | 21 | 20 | 18 | 24 | 31 | 20 | 14 | 12 | 27 | 16 | 9 | 21 | 233 | 20.8 |
| Daniels | 6 | 14 | 16 | 16 | 11 | 16 | 11 | 14 | 8 | 11 | 8 | 13 | 144 | 25.9 |
| Dawson | 12 | 19 | 31 | 25 | 21 | 19 | 13 | 16 | 15 | 18 | 17 | 20 | 226 | 22.9 |
| Deer Lodge | 19 | 13 | 20 | 18 | 26 | 17 | 20 | 23 | 13 | 26 | 14 | 23 | 232 | 14.2 |
| Fallon | 9 | 12 | 15 | 5 | 16 | 9 | 10 | 13 | 11 | 9 | 13 | 8 | 130 | 28.5 |
| Fergus | 21 | 21 | 34 | 33 | 31 | 46 | 34 | 33 | 37 | 26 | 22 | 32 | 370 | 22.4 |
| Flathead | 33 | 24 | 27 | 28 | 20 | 30 | 21 | 31 | 36 | 35 | 32 | 28 | 345 | 18.0 |
| Gallatin | 21 | 23 | 28 | 28 | 28 | 24 | 32 | 34 | 25 | 33 | 28 | 19 | 323 | 20.0 |
| Garfield | 5 | 4 | 1 | 3 | 6 | 10 | 8 | 2 | 2 | 3 | 5 | 7 | 56 | 13.2 |
| Glacier | 12 | 8 | 19 | 14 | 18 | 5 | 15 | 8 | 9 | 10 | 6 | 15 | 139 | 26.2 |
| Golden Valley | 2 | 4 | 6 | 2 | 2 | 1 | 1 | 1 | 4 | 4 | 3 | 4 | 33 | 15.6 |
| Granite | 2 | 2 | 2 | 2 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 2 | 21 | 7.0 |
| Hill | 3 | 14 | 31 | 27 | 23 | 29 | 22 | 28 | 29 | 40 | 33 | 28 | 336 | 24.4 |
| Jefferson | 2 | 2 | 7 | 3 | 1 | 2 | 4 | 3 | 4 | 3 | 4 | 2 | 37 | 9.0 |
| Judith Basin | 7 | 1 | 1 | 4 | 8 | 6 | 4 | 4 | 3 | 1 | 1 | 2 | 42 | 8.0 |
| Lake | 13 | 8 | 14 | 10 | 12 | 16 | 23 | 18 | 12 | 13 | 15 | 12 | 166 | 17.4 |
| Lewis & Clark | 29 | 34 | 40 | 27 | 27 | 25 | 20 | 21 | 24 | 22 | 27 | 25 | 321 | 17.6 |
| Liberty | 4 | 3 | 4 | 2 | 2 | 3 | 3 | 1 | 1 | 1 | 1 | 4 | 24 | 10.9 |
| Lincoln | 6 | 10 | 11 | 14 | 12 | 13 | 11 | 11 | 12 | 13 | 9 | 9 | 131 | 18.5 |
| McCone | 3 | 1 | 4 | 11 | 6 | 6 | 6 | 3 | 4 | 6 | 9 | 8 | 67 | 14.0 |
| Madison | 9 | 11 | 5 | 8 | 6 | 1 | 4 | 6 | 4 | 6 | 3 | 4 | 67 | 10.6 |
| Meagher | 1 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 2 | 1 | 19 | 8.4 |
| Mineral | 1 | 3 | 2 | 2 | 4 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 17 | 10.5 |
| Missoula | 45 | 31 | 37 | 39 | 26 | 32 | 37 | 42 | 37 | 34 | 27 | 36 | 423 | 19.4 |
| Musselshell | 13 | 10 | 17 | 15 | 15 | 12 | 19 | 17 | 18 | 19 | 8 | 10 | 173 | 23.9 |
| Park | 12 | 17 | 17 | 12 | 23 | 19 | 17 | 13 | 19 | 18 | 14 | 16 | 197 | 18.0 |
| Petroleum | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 6 | 1 | 2 | 21 | 10.3 |
| Phillips | 10 | 10 | 12 | 16 | 8 | 11 | 9 | 9 | 18 | 13 | 5 | 19 | 140 | 17.1 |
| Pondera | 11 | 11 | 18 | 10 | 12 | 8 | 16 | 17 | 11 | 14 | 12 | 15 | 154 | 22.1 |
| Powder River | 7 | 5 | 3 | 6 | 7 | 7 | 5 | 2 | 1 | 3 | 3 | 3 | 52 | 13.3 |
| Powell | 6 | 5 | 12 | 5 | 7 | 11 | 6 | 8 | 7 | 6 | 4 | 5 | 82 | 13.3 |
| Prairie | 9 | 7 | 7 | 8 | 4 | 9 | 7 | 6 | 7 | 8 | 3 | 4 | 74 | 18.8 |
| Ravalli | 14 | 18 | 17 | 10 | 17 | 18 | 16 | 17 | 18 | 16 | 18 | 7 | 186 | 18.0 |
| Richland | 13 | 14 | 19 | 26 | 16 | 12 | 21 | 18 | 29 | 18 | 20 | 9 | 215 | 22.3 |
| Roosevelt | 37 | 21 | 24 | 24 | 28 | 25 | 17 | 23 | 35 | 25 | 17 | 31 | 307 | 28.7 |
| Rosebud | 14 | 18 | 14 | 7 | 16 | 12 | 11 | 20 | 10 | 11 | 18 | 5 | 159 | 21.6 |
| Sanders | 3 | 4 | 9 | 7 | 6 | 6 | 8 | 3 | 3 | 2 | 3 | 3 | 57 | 10.0 |
| Sheridan | 9 | 17 | 10 | 10 | 14 | 24 | 16 | 23 | 14 | 18 | 12 | 14 | 181 | 18.4 |
| Silver Bow | 71 | 67 | 79 | 64 | 75 | 72 | 97 | 67 | 69 | 56 | 56 | 60 | 833 | 14.6 |
| Stillwater | 9 | 14 | 11 | 13 | 13 | 12 | 8 | 2 | 8 | 10 | 6 | 6 | 112 | 17.5 |
| Sweet Grass | 10 | 2 | 7 | 1 | 7 | 5 | 4 | 8 | 10 | 7 | 10 | 7 | 78 | 19.8 |
| Teton | 7 | 3 | 7 | 7 | 2 | 8 | 4 | 6 | 3 | 6 | 8 | 5 | 66 | 11.0 |
| Toole | 8 | 9 | 13 | 9 | 9 | 7 | 16 | 9 | 12 | 11 | 5 | 6 | 114 | 17.0 |
| Treasure | 4 | 4 | 5 | 3 | 4 | 1 | 4 | 4 | 2 | 2 | 2 | 5 | 40 | 24.1 |
| Valley | 16 | 24 | 24 | 19 | 14 | 28 | 26 | 21 | 19 | 21 | 20 | 26 | 258 | 23.1 |
| Wheatland | 5 | 13 | 6 | 3 | 9 | 5 | 6 | 9 | 10 | 6 | 10 | 3 | 85 | 22.7 |
| Wibaux | 5 | 8 | 2 | 3 | 6 | 3 | 1 | 4 | 2 | 3 | 3 | 4 | 44 | 15.9 |
| Yellowstone | 50 | 51 | 59 | 59 | 57 | 47 | 52 | 79 | 59 | 59 | 46 | 59 | 677 | 22.0 |

TABLE VI.

1929 BIRTHS BY COUNTIES & MONTHS AND RATE PER 1,000 OF POPULATION

| | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct | Nov | Dec | Total | Rate per 1,000 |
|-----------------------|-----|-----|-------|-------|-----|------|------|-----|------|-----|-----|-----|-------|-------------------|
| Montana (State Total) | 784 | 751 | 894 | 849 | 874 | 915 | 935 | 849 | 801 | 838 | 767 | 823 | 10080 | 18.7 |
| COUNTIES | | | | | | | | | | | | | | |
| Beaverhead | 8 | 5 | 10 | 11 | 8 | 8 | 11 | 5 | 4 | 5 | 6 | 5 | 86 | 13.0 |
| Big Horn | 13 | 16 | 27 | 21 | 15 | 16 | 20 | 15 | 11 | 28 | 17 | 18 | 217 | 25.4 |
| Blaine | 16 | 17 | 17 | 23 | 19 | 18 | 22 | 15 | 17 | 21 | 15 | 23 | 223 | 24.8 |
| Broadwater | 2 | 4 | 4 | 5 | 3 | 4 | 5 | 4 | 1 | 1 | | | 34 | 12.4 |
| Carbon | 19 | 16 | 21 | 19 | 17 | 19 | 24 | 13 | 16 | 15 | 19 | 12 | 210 | 16.7 |
| Carter | 4 | 5 | 7 | 6 | 7 | 3 | 14 | 6 | 3 | 4 | 4 | 4 | 66 | 16.0 |
| Cascade | 71 | 63 | 74 | 84 | 78 | 88 | 70 | 89 | 70 | 71 | 74 | 87 | 919 | 22.3 |
| Chouteau | 9 | 9 | 10 | 9 | 13 | 7 | 9 | 8 | 13 | 12 | 7 | 11 | 117 | 13.6 |
| Custer | 21 | 14 | 28 | 19 | 18 | 21 | 36 | 28 | 24 | 22 | 23 | 27 | 281 | 25.1 |
| Daniels | 7 | 10 | 7 | 15 | 17 | 16 | 19 | 16 | 9 | 7 | 13 | 10 | 146 | 26.3 |
| Dawson | 19 | 13 | 17 | 23 | 8 | 24 | 16 | 13 | 27 | 22 | 19 | 19 | 220 | 22.3 |
| Deer Lodge | 24 | 21 | 23 | 23 | 24 | 19 | 28 | 28 | 16 | 24 | 18 | 28 | 276 | 16.9 |
| Fallon | 10 | 7 | 12 | 6 | 8 | 13 | 11 | 3 | 10 | 9 | 12 | 12 | 113 | 24.7 |
| Fergus | 37 | 27 | 33 | 27 | 31 | 42 | 35 | 26 | 19 | 28 | 25 | 34 | 364 | 22.0 |
| Flathead | 30 | 30 | 33 | 34 | 27 | 38 | 33 | 22 | 21 | 23 | 32 | 33 | 356 | 18.6 |
| Gallatin | 30 | 26 | 27 | 24 | 21 | 26 | 23 | 26 | 22 | 22 | 20 | 32 | 299 | 18.6 |
| Glacier | 3 | 4 | 2 | 5 | 10 | 2 | 2 | 6 | 6 | 7 | 1 | 2 | 50 | 11.8 |
| Glacier | 10 | 12 | 13 | 12 | 11 | 9 | 15 | 14 | 14 | 20 | 6 | 10 | 146 | 27.6 |
| Golden Valley | | 1 | 2 | 3 | 1 | 3 | 3 | | 5 | | 1 | 2 | 21 | 9.9 |
| Granite | 1 | 1 | 1 | 2 | 2 | 4 | 3 | 1 | 3 | | 4 | | 26 | 8.6 |
| Hill | 25 | 35 | 32 | 30 | 35 | 38 | 28 | 33 | 28 | 33 | 22 | 22 | 362 | 26.3 |
| Jefferson | 1 | 3 | 2 | 5 | 1 | 1 | 7 | | 3 | 3 | 5 | 2 | 33 | 8.0 |
| Judith Basin | 2 | 3 | 5 | 5 | 1 | 3 | 1 | 2 | | 1 | 2 | 2 | 27 | 5.2 |
| Lake | 10 | 18 | 17 | 15 | 15 | 19 | 16 | 15 | 9 | 15 | 16 | 9 | 174 | 18.3 |
| Lewis & Clark | 28 | 38 | 33 | 19 | 30 | 42 | 26 | 19 | 29 | 27 | 29 | 28 | 348 | 19.0 |
| Liberty | 2 | | 6 | 3 | 1 | 2 | 3 | 4 | | | 1 | | 22 | 10.0 |
| Lincoln | 5 | 11 | 8 | 11 | 7 | 5 | 9 | 17 | 11 | 11 | 10 | 12 | 117 | 16.5 |
| McCone | 4 | 4 | 7 | 5 | 7 | 3 | 10 | 6 | 6 | 7 | 7 | 7 | 73 | 15.2 |
| Madison | 5 | 5 | 7 | 3 | 7 | 4 | 4 | 5 | 7 | 6 | 3 | 2 | 58 | 9.2 |
| Meagher | 3 | 3 | | 1 | 1 | 4 | 5 | 2 | | 3 | 1 | 2 | 25 | 11.0 |
| Mineral | | | | 1 | | 1 | | 2 | | | | 2 | 6 | 3.7 |
| Missoula | 32 | 33 | 47 | 35 | 41 | 36 | 52 | 29 | 41 | 27 | 21 | 31 | 425 | 19.5 |
| Musselshell | 16 | 10 | 11 | 11 | 12 | 4 | 11 | 12 | 8 | 12 | 7 | 18 | 132 | 18.3 |
| Park | 11 | 15 | 11 | 15 | 16 | 14 | 15 | 10 | 13 | 9 | 6 | 15 | 150 | 13.7 |
| Petroleum | | 2 | 2 | 2 | | 5 | 3 | 2 | | 3 | 2 | 1 | 22 | 10.8 |
| Phillips | 19 | 7 | 8 | 17 | 15 | 11 | 17 | 14 | 13 | 16 | 12 | 10 | 159 | 19.4 |
| Pondera | 23 | 17 | 16 | 14 | 14 | 13 | 13 | 14 | 11 | 12 | 13 | 9 | 169 | 24.3 |
| Powder River | 2 | 5 | 3 | 7 | 3 | 4 | 4 | 8 | 5 | 4 | 3 | 6 | 54 | 13.8 |
| Powell | 5 | 4 | 3 | 6 | 7 | 7 | 3 | 5 | 7 | 4 | 4 | 8 | 63 | 10.2 |
| Prairie | 4 | 5 | 8 | 6 | 9 | 5 | 3 | 8 | 6 | 5 | 5 | 5 | 69 | 17.5 |
| Ravalli | 10 | 11 | 17 | 16 | 14 | 15 | 15 | 14 | 19 | 18 | 19 | 17 | 185 | 18.0 |
| Richland | 20 | 10 | 22 | 12 | 17 | 19 | 13 | 15 | 21 | 12 | 19 | 20 | 200 | 20.8 |
| Roosevelt | 20 | 29 | 22 | 24 | 30 | 26 | 27 | 30 | 22 | 35 | 22 | 24 | 311 | 29.1 |
| Rosebud | 12 | 13 | 22 | 14 | 16 | 17 | 18 | 19 | 19 | 9 | 10 | 6 | 175 | 23.8 |
| Sanders | 4 | 7 | 5 | 4 | 5 | 5 | 2 | 4 | | 6 | 4 | 5 | 51 | 9.0 |
| Sheridan | 12 | 7 | 17 | 24 | 17 | 18 | 25 | 15 | 12 | 14 | 13 | 6 | 180 | 18.3 |
| Silver Bow | 77 | 66 | 72 | 64 | 88 | 92 | 78 | 74 | 78 | 87 | 85 | 70 | 931 | 16.3 |
| Stillwater | 10 | 9 | 16 | 9 | 12 | 9 | 8 | 8 | 11 | 13 | 13 | 8 | 126 | 20.2 |
| Sweet Grass | 6 | 4 | 5 | 7 | 5 | 5 | 12 | 5 | 10 | 4 | 7 | 13 | 83 | 21.0 |
| Teton | 6 | 4 | 6 | 3 | 5 | 14 | 6 | 11 | 5 | 6 | 9 | 3 | 78 | 12.9 |
| Toole | 8 | 3 | 5 | 4 | 13 | 12 | 5 | 13 | 1 | 6 | 8 | 10 | 88 | 13.1 |
| Treasure | 3 | 1 | 2 | 2 | | 4 | 2 | 1 | 3 | 3 | 3 | 2 | 26 | 15.7 |
| Valley | 18 | 20 | 26 | 21 | 23 | 13 | 22 | 24 | 22 | 23 | 16 | 20 | 248 | 22.2 |
| Wheatland | 4 | 9 | 7 | 8 | 2 | 4 | 5 | 7 | 9 | 7 | 9 | 7 | 78 | 20.8 |
| Wibaux | 2 | 3 | 2 | 6 | | 5 | 2 | 7 | 7 | 2 | 3 | 1 | 40 | 14.5 |
| Yellowstone | 41 | 36 | 54 | 49 | 67 | 56 | 66 | 57 | 54 | 55 | 41 | 46 | 622 | 20.3 |

THE LEADING CAUSES OF DEATH

The ten leading causes of death in the state in 1929 in order of importance:

- | | |
|--------------------------|----------------------------|
| 1 Heart | 6 Tuberculosis (all forms) |
| 2 Accidents | 7 Early Infancy |
| 3 Cancer | 8 Apoplexy |
| 4. Pneumonia (all forms) | 9 Influenza |
| 5 Nephritis | 10 Appendicitis |

Comparing these with the leading causes ten and twenty years ago, there are three things to which particular attention is called.

(1) Typhoid Fever was the 9th greatest cause of death in Montana in 1910, in both 1920 and in 1929 it dropped to one of the minor causes.

(2) Diarrhea and enteritis under two years of age was 6th greatest cause in 1910, in 1920 it was 11th and in 1929 it had dropped far down the list.

(3) All forms of tuberculosis constituted the second largest class of death dealing diseases in 1910. These were 4th in 1920 and 6th in 1929.

For the others, diseases of the heart were 1st in both 1929 and 1920 but 3rd in 1910, accidents were 2nd in 1929 and 1920 but 1st in 1910. Cancer has continuously crept up through the list from 8th in 1910 to 7th in 1920, to 3rd in 1929. All forms of pneumonia were 4th, 5th and 4th respectively in 1929-20-10 indicating practically no change through the twenty years. Nephritis was 5th last year, 8th in 1920 and 7th in 1910. Diseases of early infancy and congenital malformations have fallen off markedly from 5th and 3rd in 1910 and 1920 to 7th place in 1929. Apoplexy has crept up slightly from 10th place in 1910 to 9th in 1920 to 8th in 1929. Influenza was one of the minor causes of death in 1910, in 1920 it held 6th place and in 1929 it was 9th. Appendicitis was not among the 1st ten causes in 1910 but was the 10th greatest cause of death in both 1920 and 1929.

A summary of the statistical particulars of the 1928-1929 deaths is as follows:

| | 1928 | Percent | 1929 | Percent |
|-------------------------|------|---------|------|---------|
| Total | 5812 | 100.00 | 5748 | 100.00 |
| Males | 3703 | 63.7 | 3689 | 64.2 |
| Females | 2109 | 36.3 | 2059 | 35.8 |
| Single | 2286 | 39.3 | 2291 | 39.9 |
| Married | 2264 | 39.0 | 2224 | 38.7 |
| Widowed | 1010 | 17.4 | 988 | 17.2 |
| Divorced | 147 | 2.5 | 152 | 2.6 |
| Unknown | 105 | 1.8 | 93 | 1.6 |
| White | 5402 | 92.9 | 5328 | 92.7 |
| Indian | 348 | 6.0 | 366 | 6.4 |
| Black | 43 | 0.7 | 31 | 0.5 |
| Yellow | 17 | 0.3 | 19 | 0.3 |
| Brown | 2 | .... | 4 | 0.1 |
| Native Born | 4379 | 75.3 | 4524 | 78.7 |
| Foreign Born | 1433 | 24.7 | 1224 | 21.3 |
| Infants under 1 yr..... | 619 | .... | 640 | .... |
| Stillbirths | 348 | .... | 295 | .... |

INFANT AND MATERNAL DEATHS

The infant deaths increased from 619 in 1928 to 640 in 1929 and the infant mortality rate increased from 61.5 in 1928 to 63.5 per 1,000 live births in 1929. The 1928 infant mortality rate was the lowest ever recorded in the history of the state, while the 1929 rate is 4.5 per 1,000 lower than the 68 for the United States Registration Area that year.

Conversely in the case of maternal mortality the Montana rate is higher than the Registration Area by 1.4 per 1,000 live births in 1929, the state rate being 8.4 compared to 7.0 per 1,000 live births for the area. The deaths from puerperal septicemia were exactly one-half of the total puerperal deaths, giving Montana a rate of 4.2 sepsis deaths and 4.2 for all other puerperal causes. The census Bureau comments that Montana with the rate of 4.2 has the highest rate from septicemia of any state in the Registration Area.

A STUDY OF THE INDIAN POPULATION OF MONTANA OVER THE FIVE YEAR PERIOD—1925-1929.

The 1920 census gave the Indian population of Montana as 10,956. With the exception of 273, they were listed as residing on or near the seven reservations of the state.

The reservations, the counties in which the reservations are located and the number of Indians listed from these counties in 1920 were:

| Reservation | Counties | No. Indians |
|---------------------------|---|-------------|
| 1. Crow..... | { Big Horn* Yellowstone } | 2141 |
| 2. Fort Belknap..... | { Blaine Phillips } | 1442 |
| 3. Blackfeet..... | { Glacier Pondera Teton } | 2255 |
| 4. Rocky Boy..... | { Hill } | 401 |
| 5. Flathead..... | { Lake Flathead Missoula Sanders } | 1677 |
| 6. Fort Peck..... | { Roosevelt Valley Sheridan } | 1998 |
| 7. Northern Cheyenne..... | { Rosebud* } | 769 |
| All Others..... | | 273 |
| Total..... | | 10,956 |

* The Northern Cheyenne reservation extends into Big Horn County. The population of this reservation is greater than the 769 reported from Rosebud County and the population of the Crows is less than that reported from Big Horn County.

The increase of birth over deaths reported during the five year period 1925-1929 was 559. There were 2296 Indian births and 1737 deaths reported during the period. If this same ratio held true for the 1st five years after the 1920 census the Indian population for 1930 should be 1120 plus the 1920 population or 12,076. (The emigration and immigration is so slight among the Indians that it would have no appreciable effect). However, the 1900 Indian population was 11,343 and the 1910, 10,745, a loss of 588. The 1920 census gave 10,956 which was a gain of only 211. If the past decade increase was used as a basis of estimate the increase would be only about one-fifth of that made from the increase of births over deaths. (The Bureau of Indian Affairs estimated Montana Indian population in 1927 as 13,273). For purposes of this study we are using the Indian population at 12,000. Note—The 1930 Indian Census figures were not available at the time of writing this article.

The following table No. VII shows the causes of death by Age groups for the five years 1925-1929.

TABLE VII—DEATHS OF MONTANA INDIANS BY AGE GROUPS AND CAUSES—1925 TO 1929

| Int. No. | Causes | Age Groups | 1 Yr. | 1-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80- | Total | Percent | 5-Year Average | Rate per 100,000 |
|-------------------------|----------------------------|------------|-------|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|---------|----------------|------------------|
| 1 | Typhoid | | 1 | | 4 | | 1 | | 3 | | | | | 1 | | | | | | | 9 | .5 | 2 | 16.7 |
| 6 | Small Pox | | | | | | | | | | | | | | | | | | | | 1 | | 5 | |
| 7 | Measles | | 1 | 15 | | 2 | | | | | | | | | | | | | | | 24 | 1.4 | 5 | 41.7 |
| 8 | Scarlet Fever | | 1 | | | | | | | | | | | | | | | | | | 3 | .2 | 1 | 8.3 |
| 9 | Whooping Cough | | 25 | 24 | 2 | 1 | | | | | | | | | | | | | | | 52 | 3.0 | 11 | 91.7 |
| 10 | Diphtheria | | 1 | 3 | | | | | | | | | | | | | | | | | 5 | .3 | 1 | 8.3 |
| 11 | Influenza | | 35 | 7 | 3 | 3 | 1 | | | | 2 | 2 | 3 | 2 | 1 | 1 | 5 | 6 | 3 | 6 | 79 | 4.5 | 16 | 133.3 |
| 16 | Dysentery | | | | | | | | | | | | | | | | | | | | 1 | | | |
| 21 | Erysipelas | | 1 | | | | | | | | | | | | | | | | | | 3 | .2 | 1 | 8.3 |
| 22 | Poliomyelitis | | | | | | | | | | | | | | | | | | | | 1 | | | |
| 23 | Lethargic Encephalitis | | | | 1 | | | | | | | | | | | | | | | | 1 | | | |
| 24 | Epidemic Meningitis | | 6 | 7 | 5 | 1 | 2 | 1 | 1 | | | | | | | | | | | | 22 | 1.3 | 4 | 33.3 |
| 25 | Chicken Pox | | 3 | | | | | | | | | | | | | | | | | | 3 | .2 | 1 | 8.3 |
| 29 | Tetanus | | 1 | | | | | | | | | | | | | | | | | | 2 | .1 | | |
| 31 | Pul. Tuberculosis | | 12 | 35 | 32 | 41 | 46 | 43 | 37 | 30 | 12 | 23 | 15 | 11 | 9 | 9 | 8 | 12 | 12 | 2 | 389 | 22.4 | 78 | 650.0 |
| 32 | Tub. Meningitis | | 8 | 19 | 8 | 4 | 1 | | 3 | | | | | | | | | | | | 43 | 2.5 | 9 | 75.0 |
| 33-37 | Other Tuberculosis | | 2 | 15 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 4 | 6 | 2 | 2 | | | | 46 | 2.6 | 9 | 75.0 |
| 38 | Syphilis | | 2 | | | | | | 3 | | 2 | 2 | 2 | 5 | 7 | 9 | 5 | 3 | 7 | 1 | 46 | 2.6 | 9 | 75.0 |
| 43-50 | Cancer | | | | | | | | | | | | | | | | | | | | 6 | .3 | 1 | 8.3 |
| 57 | Diabetes | | | | | | | | | | | | | | | | | | | | 1 | | | |
| 66 | Alcoholism | | | | | | | | | | | | | | | | | | | | 6 | .3 | 1 | 8.3 |
| 68 | Chronic Poisoning (Peyote) | | 2 | | | | | | | | | | | | | | | | | | 3 | .2 | 1 | 8.3 |
| 74 | Apoplexy | | | | | | | | | | | | | | | | | | | | 2 | .1 | | |
| 87-90 | Heart | | 3 | | | 2 | 1 | 2 | 4 | | | | | | | | | | | | 20 | 1.2 | 4 | 33.3 |
| 100 | Bronchopneumonia | | 53 | 24 | 3 | | | | 3 | | 1 | 4 | 2 | 3 | 1 | 7 | 4 | 9 | 2 | 12 | 60 | 3.5 | 12 | 100.0 |
| 101 | Pneumonia | | 53 | 32 | 6 | 2 | 2 | | 2 | | 1 | 4 | 2 | 1 | 5 | 8 | 7 | 5 | 13 | 7 | 92 | 5.3 | 18 | 150.0 |
| 113-114 | Diarrhea & Enteritis | | 34 | 28 | | | | | | | | | | | | | | | | | 151 | 8.7 | 30 | 250.0 |
| 117 | Appendicitis | | | | 1 | | | 2 | | 2 | 1 | | | | | | | | | | 1 | | 1 | 8.3 |
| 118 | Intestinal Obstruction | | 2 | | | 1 | | | | | | | | | | | | | | | 7 | .4 | 1 | 8.3 |
| 128-129 | Nephritis | | | 1 | 1 | | | | | | | | | | | | | | | | 13 | .7 | 3 | 25.0 |
| 143-150 | Pericardial | | | | | | | | | | | | | | | | | | | | 31 | 1.8 | 6 | 50.0 |
| 159 | Congenital Malformations | | 20 | | | 1 | 1 | 2 | 4 | 2 | 3 | 2 | | | | | | | | | 14 | .8 | 3 | 25.0 |
| 160-163 | Old Age | | 101 | | | | | | | | | | | | | | | | | | 21 | 1.2 | 4 | 33.3 |
| 164 | Early Infancy | | | | | | | | | | | | | | | | | | | | 101 | 5.8 | 20 | 166.7 |
| 165-174 | Suicide | | | | | | | 2 | 1 | 1 | | | | | | | | | | | 58 | 3.3 | 12 | 100.0 |
| 175-202 | Accidental | | 5 | 8 | 6 | 5 | 3 | 3 | 7 | 8 | 1 | 1 | 2 | 1 | 5 | 2 | 2 | 5 | 2 | 7 | 70 | 4.0 | 14 | 116.7 |
| 197-199 | Homicides | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 6 | 11 | .6 | 2 | 16.7 |
| 204-205 | Undefined | | 58 | 17 | 3 | 4 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 9 | 6 | 7 | 6 | 8 | 137 | 7.9 | 27 | 225.0 |
| | All Others | | 28 | 18 | 6 | 4 | 5 | 5 | 2 | 3 | 3 | 5 | 2 | 3 | 6 | 7 | 11 | 5 | 6 | 4 | 123 | 7.1 | 25 | 208.3 |
| TOTALS | | | 465 | 257 | 86 | 74 | 70 | 69 | 74 | 50 | 40 | 53 | 35 | 52 | 48 | 63 | 59 | 65 | 62 | 115 | 1,737 | | | |
| PERCENT OF TOTAL DEATHS | | | 26.8 | 14.8 | 5.0 | 4.3 | 4.0 | 4.0 | 4.3 | 2.9 | 2.3 | 3.0 | 2.0 | 3.0 | 2.8 | 3.6 | 3.4 | 3.7 | 3.6 | 6.5 | | | | |

The average number of deaths for the five year period from the various causes of death and the rates per 100,00 on an estimated population of 12,000 will be found in the last two columns of the preceding table.

The greatest cause of death was pulmonary tuberculosis, which accounted for 22.4% of the total. Other forms of tuberculosis amounted to 5.1%, the total for tuberculosis being 27.5. In other words, slightly over every 4th death among Montana Indians during the five years 1925-1929 was due to some form of tuberculosis. The second greatest cause of death was pneumonia with 8.7% of the total. If broncho-pneumonia is included the total for all forms of this disease was 14%, or one in seven deaths. Diseases of early infancy including congenital malformations amounted to 7%. Influenza 4.5%; Accidents 4%; Diarrhea and Enteritis 3.7%; Heart 3.5%; Old Age 3.3%; Whooping Cough 3.0%; Causes of Death marked unknown were 7.9%. The total communicable diseases accounted for 40% of the deaths or two out of five.

By ages we find 26.8% of the deaths occurring under one year. 14.8% for 1-4 years, making 41.6% under five years. 50.9% or one-half the deaths occurred under fifteen years of age. Thirteen years being the median age.

By age groups the principal diseases were: under 1 year in which there were 465 deaths or 26.8% of the total. Small Pox, 1, the only death from this disease during the five years; Measles, 7; Scarlet Fever, 1; Whooping Cough, 25 or 5.3%; Diphtheria, 1; Influenza 35 or 7.5%; Dysentery, 1; Erysipelas, 3; Epidemic Meningitis, 6; Chicken Pox, 3; Tetanus, 1; Tuberculosis, all forms, 22 or 4.7%; Syphilis, 2; Heart, 3; Pneumonia, all forms, 106 or 22.8%; Diarrhea and Enteritis, 34 or 7.3%; Congenital Malformations, 20; Early Infancy, 101 or 21.7%; Accidents, 5; Unknown 58, and all other diseases 28. The communicable disease amounted to 108, the pneumonias 106 and early infancy 101, a total of 315 which is 67.7% or slightly over $\frac{2}{3}$ of the total. It is unfortunate that there should be 58 unknown causes of death in this group.

In the group 1-4 years we have 257 deaths, this is 14.8% or one-seventh of the total Indian deaths. Measles amounted to 15; Scarlet Fever 1; Whooping Cough 24 or 9.3%; Diphtheria 3; Influenza 7; Epidemic Meningitis 7; Tuberculosis, all forms 69 or 26.8% more than one-fourth of the group; Peyote poisoning 2; Pneumonia, all forms, 56 or 21.8% more than one-fifth of this group; Diarrhea and Enteritis 28 or 10.9%; Intestinal obstruction and Nephritis 1 each; Accidents 8; Unknown 17 and all other diseases 18. The communicable diseases amounted to 126 or 49%, practically half of the deaths in the group. The pneumonias with 56 were second and diarrhea and enteritis 28, were third.

In the 5-9 year group in a total of 86 deaths tuberculosis accounted for 43 or exactly one-half, the other communicable deaths were Typhoid 4; Measles 2; Scarlet Fever 1; Whooping Cough 1; Influenza 3; Poliomyelitis 1; Epidemic Meningitis 5. There is a marked falling off in the pneumonias which were 9 and the unknown causes were only 3.

In the 10-14 group with a total of 74 deaths we find 48 or 64.9%, almost two-thirds due to tuberculosis. All other communicable diseases 8; Pneumonias 2; Accidents 5, and Unknown 4.

In the groups 15-19, 20-24, 25-29, 30-34 tuberculosis accounts for over 50% of the deaths, while deaths for heart disease, alcoholism, puerperal causes and suicides begin to appear. The groups from 35 upward all show more deaths from tuberculosis than from any other cause but are less than 50%, while heart, nephritis, influenza, and senility constantly increase with the higher ages.

HYGIENIC LABORATORY BIENNIAL REPORT

1929-1930 (ending Oct. 31)

FRED STIMPERT, Director

Functions of the Laboratory

The purpose of the Hygienic Laboratory is to maintain a laboratory service in the diagnosis of disease for the people of Montana, through their physicians. This service is given free of charge. There has been a constant increase in demand for this service making an increase of 4,384 examinations over the same period of 1927-1928. The total number of examinations made was 36,197, coming from over 450 physicians throughout the State. Mailing containers with sterilized vials, culture tubes and other suitable receptacles for the collection of the various specimens are prepared and sent out to physicians for their use in collecting the specimens. The total number of containers sent out was 29,463, which is an increase of 4,383 over the same period of 1927-1928.

Complete tables showing in detail the nature and number of the different types of examinations are given below.

Educational Work

During the past year two series of lectures on Bacteriology were given by the staff to classes of nurses.

The following papers were given:

To the State Association of Graduate Nurses on Rocky Mountain Spotted Fever Vaccination.

To a County Association of Graduate Nurses on Tularemia.

To the State Embalmers Institute on the Principles of Bacteriology.

To a High School group on Heredity and Infectious Diseases.

Considerable correspondence has been handled in response to requests for information on laboratory work and procedures. Several sets of slides showing various types of stained bacteria have been prepared and sent to teachers for use in their classes.

Three persons, with previous training, have come to the laboratory for periods of one week to two months to observe and study laboratory procedures.

Special Investigations

Following the Typhoid Epidemic at Helena in the fall of 1929, the Hygienic Laboratory carried on a detailed experimental investigation to determine the number of carriers and to work out a standard procedure for the examination of carriers. Special attention was given to the food handlers and from these 5 to 15 specimens of feces from each person was examined for *B. typhosus*. Through co-operation with the local County Health Department accurate check was kept on the whereabouts of these persons and series of 3 to 5 consecutive samples were collected

from time to time and sent in to this laboratory. Since every convalescent may be considered a potential carrier for at least 3 months after recovery the bulk of the carrier analysis was carried on from January through April, 1930.

The first consideration was to prepare a suitable container for the collection of stool specimens. A sterile 1 ounce bottle, with metal cap, containing 10 cc. of 30% glycerine in 0.85% salt solution was found to be very satisfactory for the preservation of the specimens.

Since the technic for the isolation of *B. typhosus* from stools varies considerably in different reliable laboratories and there has been no standardized method universally accepted, an attempt was made to work out a technic suitable for this laboratory and the following was found to be very satisfactory:

Three types of mediums were used for the plating on Petri culture plates—0.2 and 0.3% brilliant green agar, Endos agar and Eosin Methylene blue agar. The brilliant green was used as an inhibitory medium to inhibit *B. coli* and other organisms and each batch prepared was titrated with a known culture of *B. typhosus* to determine its optimum growth and with a suspension of feces containing *B. coli* and other organisms to determine the degree of inhibition. Two plates of each type of medium were used for each specimen. Two dilutions of feces suspension on each medium were used to insure isolation of colonies for fishing. Characteristic colonies were fished to Russell's double sugar and Krumwieds triple Sugar stabs and slants. If typical sugar reactions were found cultures were made on agar slants and in nutrient broth for agglutination tests. All suspicious organisms were tested with immune serums of *B. typhosus*, Para A., Para B., *B. coli*, Para-dysentery and a positive carrier was determined by a high agglutination in *B. typhosus* serum.

The addition of the brilliant green medium plates greatly increased the chances of finding and isolating *B. typhosus*, especially in specimens heavy with other organisms. In some cases a practically pure culture of *B. typhosus* was found on the brilliant green plate when plates of the other mediums showed only a few colonies crowded with a heavy growth of other bacteria. In specimens with very light bacterial content, however, there would sometimes be no growth at all on the brilliant green so it would not be advisable to use it alone.

A total of 330 stool specimens were examined from 168 convalescents. The number of carriers found were as follows: 10 persons having stools positive for *B. typhosus* 3 months after recovery and followed by no negatives; 6 persons more than 30 days after recovery and followed by no negatives; 6 persons less than 30 days after recovery and followed by no negatives.

During September, 1930, an investigation was made of ten cases of dysentery at Butte. Since these cases were rather unusual and more severe considerable laboratory work was done on blood and stool specimens.

An atypical organism was isolated which gave unusual reactions with immune serums. Sufficient work has not been done as yet to enable us to give a definite report as to the exact species of organism at this

time. However, this work has given a working basis for further progress and attacking the problem if it arises again next season.

The Hygienic Laboratory appreciates the valuable co-operation of the other departments of the State Board of Health and the private physicians who have helped to make this work possible.

New Studies and Developments

The experimental work on the Complement Fixation test for Tuberculosis started two years ago has been carried on with valuable results. Several changes have been made in adapting this test to our routine Wassermann procedure. 473 tests have been completed and histories of the patients secured wherever possible. The results have been quite satisfactory and may warrant its adoption as a valuable routine procedure in the future.

A number of Kahn tests for the diagnosis of Syphilis have been run in comparison with our Wassermann tests. The results found so far have been very satisfactory and further work will show whether it can be adapted to the conditions of our laboratory and prove to be a good routine procedure.

A new cork for corking Diphtheria culture tubes that are sent out to physicians for the collection of throat cultures has been prepared. Ordinary corks are soaked in a paraffin-vaseline mixture and inserted in the opening of the tube so that the tube is air tight and the cotton stopper is held in place. The media does not dry as rapidly and cultures reach the laboratory in better condition.

A new bottle for the collection of feces and sputum has been adopted. This is a wide-mouthed, heavy glass, 1 ounce bottle fitted with a Upressit metal cap containing a gum rubber washer. With this the specimens do not leak out endangering the handler and laboratory worker.

A traveling laboratory is being constructed and provided for the combined laboratories by building a shipping case to fit one of our incubators. A sterilizer and sufficient equipment can be placed inside and taken along in any emergency to do suitable laboratory work in the field.

Special Comment

A study of our agglutination test for Undulant Fever showed that an overnight incubation in a water bath at 37.5° C. followed by several hours in the ice box was superior for reading positive results than a shorter incubation period. 5 positives out of 156 tests were found in 1929 and 8 positives out of 94 in 1930 so far.

A change in the broth medium for carrying daily cultures of the Typhoid organisms used in the Widal test has given better results.

Yearly charts showing by monthly totals the progress and increase in the number of laboratory examinations have been prepared for past years and will be continued in the future.

A decided increase in the number of sputa for tuberculosis and smears for gonorrhea sent in for examination has been noticed in the last few months.

A decrease of 350 throat cultures for Diphtheria is in accord with the decrease in the disease apparent in the last few years.

HYGIENIC LABORATORY REPORT OF LABORATORY EXAMINATIONS

1929-1930 (Jan. to Nov.)

| BLOOD EXAMINATIONS | 1929 | | 1930 | |
|---|-------|--------|--------------|-------|
| | | | Jan. to Nov. | |
| Syphilis, Wassermann reaction..... | | 12,340 | | 9,410 |
| Pos..... | 1,783 | | 1,180 | |
| Neg..... | 9,265 | | 7,871 | |
| Unsat..... | 1,292 | | 359 | |
| Gonorrhea, Complement Fixation test..... | | 158 | | 119 |
| Pos..... | 25 | | 17 | |
| Neg..... | 121 | | 98 | |
| Unsat..... | 12 | | 4 | |
| Tuberculosis, Complement Fixation test..... | | 215 | | 239 |
| Pos..... | 127 | | 107 | |
| Neg..... | 63 | | 129 | |
| Unsat..... | 25 | | 3 | |
| Typhoid, Widal Reaction..... | | 894 | | 461 |
| Pos..... | 346 | | 90 | |
| Neg..... | 537 | | 371 | |
| Unsat..... | 11 | | | |
| B. paratyphosus "A"..... | | 819 | | 458 |
| Pos..... | 23 | | 38 | |
| Neg..... | 789 | | 480 | |
| Unsat..... | 7 | | | |
| B. paratyphosus "B"..... | | 818 | | 458 |
| Pos..... | 70 | | 64 | |
| Neg..... | 742 | | 394 | |
| Unsat..... | 6 | | | |
| Tularemia, agglutination test..... | | 20 | | 18 |
| Pos..... | 3 | | | |
| Neg..... | 17 | | 18 | |
| Undulant Fever, agglutination test..... | | 156 | | 94 |
| Pos..... | 5 | | 8 | |
| Neg..... | 145 | | 85 | |
| Unsat..... | 6 | | 1 | |
| Blood Cultures..... | | 26 | | 36 |
| Blood Sugar..... | | 13 | | 31 |
| Coagulation time..... | | 6 | | |
| Blood Grouping..... | | 3 | | 7 |
| Matching..... | | | | 9 |
| Cell Count..... | | 66 | | 52 |
| Hemoglobin..... | | 60 | | 42 |
| Differential..... | | 60 | | 35 |
| Malaria..... | | | | 1 |
| Kahn Test..... | | | | 1 |
| Cow's Blood, Undulant Fever..... | | | | 1 |
| Neg..... | | | 1 | |
| SPINAL FLUID EXAMINATIONS | | | | |
| Wassermann..... | | 225 | | 239 |
| Pos..... | 53 | | 37 | |
| Neg..... | 184 | | 187 | |
| Unsat..... | 18 | | 15 | |
| Colloidal Gold..... | | 165 | | 119 |
| Clobulin..... | | 114 | | 17 |
| Bacteriological..... | | 55 | | 40 |
| Pos..... | 16 | | 10 | |
| Neg..... | 36 | | 29 | |
| Unsat..... | 2 | | 1 | |

| | 1929 | 1930 Jan. to Nov. |
|---|------|----------------------|
| Tuberculosis, Complement Fixation test..... | 2 | 2 |
| Pos..... | 1 | |
| Neg..... | 1 | |
| Unsat..... | | 2 |
| Cell Count..... | 31 | 7 |
| Sugar..... | 2 | 1 |
| Chemical..... | | 1 |

THROAT CULTURES

| | | |
|------------------------------------|-------|-----|
| Diphtheria..... | 1,046 | 696 |
| Pos..... | 269 | 180 |
| Neg..... | 749 | 508 |
| Unsat..... | 28 | 8 |
| Hemolytic Streptococci..... | 232 | 287 |
| Pos..... | 84 | 94 |
| Neg..... | 146 | 186 |
| Unsat..... | 2 | 7 |
| Meningococci..... | 32 | 24 |
| Pos..... | | 8 |
| Neg..... | 26 | 16 |
| Unsat..... | 6 | |
| Virulence Test for Diphtheria..... | 1 | 1 |
| Psittacosis..... | | 1 |
| Other Organisms..... | 29 | 36 |

SMEARS, SLIDE EXAMINATIONS

| | | |
|-----------------------|-------|-------|
| Gonorrhea..... | 1,093 | 1,241 |
| Pos..... | 292 | 300 |
| Neg..... | 783 | 932 |
| Unsat..... | 18 | 9 |
| Vincent's Angina..... | 115 | 36 |
| Pos..... | 69 | 11 |
| Neg..... | 45 | 25 |
| Unsat..... | 1 | |
| Anthrax..... | | 1 |
| Miscellaneous..... | 65 | 63 |

SPUTUM EXAMINATIONS

| | | |
|-----------------------------|-----|-----|
| B. tuberculosis..... | 724 | 763 |
| Pos..... | 118 | 136 |
| Neg..... | 601 | 619 |
| Unsat..... | 5 | 8 |
| Psittacosis..... | | 1 |
| Guinea Pig Inoculation..... | | 4 |
| Miscellaneous..... | | 3 |

TRANSUDATE AND EXUDATE EXAMINATIONS

| | | |
|--------------------------|----|----|
| Bacteriological..... | 41 | 21 |
| Chemical..... | 3 | 6 |
| Microscopic..... | 3 | |
| Animal Inoculations..... | 3 | |

FECES EXAMINATIONS

| | | |
|--------------------------|-----|-----|
| B. typhosus..... | 288 | 242 |
| Pos..... | 49 | 32 |
| Neg..... | 207 | 193 |
| Unsat..... | 32 | 17 |
| B. paratyphosus "A"..... | 75 | 75 |
| Neg..... | | |

MONTANA STATE BOARD OF HEALTH

43

| | 1929 | 1930 Jan. to Nov. |
|--------------------------|------|----------------------|
| B. paratyphosus "B"..... | 75 | |
| Neg..... | | |
| Other Organisms..... | 12 | 7 |
| Parasites..... | 9 | 16 |
| Blood..... | 1 | 2 |
| Pus..... | 1 | |
| Chemical..... | 1 | |

URINE EXAMINATIONS

| | | |
|---------------------------------|---------------|---------------|
| Microscopic..... | 152 | 132 |
| Chemical..... | 149 | 129 |
| Bacteriological..... | 11 | 4 |
| Guinea Pig Inoculations..... | 20 | 8 |
| B. typhosus..... | 12 | 5 |
| Pos..... | | 1 |
| Neg..... | 12 | 4 |
| B. paratyphosus "A"..... | | |
| Neg..... | 12 | 12 |
| B. paratyphosus "B"..... | | |
| Neg..... | 12 | 12 |
| Conococci..... | | 1 |
| Autogenous Vaccine..... | 32 | 30 |
| Breast Milk..... | 14 | 21 |
| Sterility test for Vaccine..... | 1 | |
| Cow's Milk..... | | 2 |
| Sterility Test, Catgut..... | | 1 |
| TOTAL | 20,515 | 15,682 |
| GRAND TOTAL | | 36,197 |

CONTAINERS DISTRIBUTED

| | | |
|---|---------------|---------------|
| Wassermann..... | 10,974 | 7,501 |
| Diphtheria..... | 2,218 | 1,846 |
| Tuberculosis..... | 837 | 892 |
| Gonorrhea..... | 1,466 | 1,790 |
| Feces..... | 362 | 273 |
| Widals..... | 1,050 | 186 |
| Undulant Fever..... | 5 | |
| Blood Cultures..... | 2 | |
| Agar Slants..... | | 8 |
| Blood Plates..... | | 6 |
| Miscellaneous..... | | 47 |
| TOTAL | 16,914 | 12,549 |
| Total Containers Distributed | | 29,463 |

REPORT OF THE DIVISION OF WATER AND SEWAGE

Biennial Period Ending October 31, 1930.

H. B. FOOTE, Director,
W. M. COBLEIGH, Consultant,
J. W. FORBES, Assistant.

The principal work of the Division of Water and Sewage is comprised of the following activities:

1. Bacteriological and chemical examination of water samples of both public and private supplies.
2. Field inspection of public and private water supplies.
3. Inspection of plans for public water supplies.
4. Field inspection of sewage disposal systems.
5. Inspection of plans for public sewage disposal systems.
6. Inspection of tourist camps and their water supplies.
7. Inspection and approval of plans for public school buildings.

A limited amount of interchange of work is made with the Food and Drug Division in the field whereby economy is effected.

LABORATORY ANALYSIS OF WATER

The analysis of samples of water makes up the bulk of the laboratory work. A check upon the condition and operation of public water supplies is obtained by frequent routine bacteriological analysis. In order that each supply will receive proper attention at regular intervals, a calendar has been prepared which lists for each week the cities to which sampling equipment is to be sent. The equipment is usually sent out on Thursday.

The State Board of Health owns a considerable number of insulated shipping cases and bottles which are used for the collection and shipment of samples. These are sent by express, properly sealed, to the collector, who after collection of samples packs them with ice, seals and returns them to the laboratory by express, charges collect. The collector is usually the local water superintendent or the health officer, who is carefully instructed in the matter.

This system fits very satisfactorily into our extensive territory where the visiting of supplies is attended by considerable expense. The local collectors co-operate excellently so that little delay due to their failure to collect is experienced.

For the sealing, a self-locking tin seal is used on which is stamped the name of the State Board of Health, and a number for identification.

Laboratory Activity

November 1, 1928, to October 31, 1930

The following tabulation gives the amount of laboratory work done by this division during the past two years. The number of chemical analyses has increased and requests for this type of work are being received constantly. Especially during the summer season when the field work requires much travel by the director or his assistant, leaving but one in the laboratory, there is need for extra help. This has been available during the past three years, though during 1930 Mr. Kane, the analyst, worked but two months.

| | Bacterial | Chemical |
|--|-----------|----------|
| Samples analysed from city water supplies | 7,916 | 93 |
| Samples analysed from private water supplies..... | 846 | 380 |
| Samples analysed from miscellaneous sources, (schools, tourist camps, etc.)..... | 680 | 62 |
| | 9,442 | 535 |
| Total of all samples..... | 9,977 | |
| Previous Biennial period..... | 6,919 | |

FIELD INSPECTIONS

Practically all field work is done by railway travel since the water supplies and sewage disposal systems are in towns touched by the railroads. It is the intention and endeavor of this division to see each supply once a year and the larger, and especially the purification plants, oftener. The personnel of the division traveled in this work approximately 18,000 miles during the period.

When in a given city, private water supplies, swimming pools, ice fields and tourist camps are visited in addition to the public structures. It is our wish to do more rural work, but funds are limited.

In 1917 the law providing for regular inspections and analyses of public water supplies was passed and the work started in July. Under this law the State Board of Health is given authority to assess a fee against each city or town having a supply. The following schedule was put into effect.

| Source of water supply— | | Number of such in Montana |
|----------------------------|------------|---------------------------------|
| Ground—(springs and wells) | | |
| Population | Annual Fee | |
| Under 500 | \$12.50 | 17 |
| 500-1,000 | 20.00 | 14 |
| 1,000-2,000 | 25.00 | 8 |
| 2,000-3,000 | 30.00 | 3 |
| 3,000-5,000 | 35.00 | .... |
| 5,000-15,000 | 40.00 | 3 |
| 15,000 and up..... | 50.00 | .... |
| Surface—(streams, lakes) | | |
| Under 1,500 | 30.00 | 29 |
| 1,500-3,000 | 50.00 | 6 |
| 3,000-6,000 | 90.00 | 4 |
| 6,000-10,000 | 100.00 | 2 |
| 10,000 and above..... | 150.00 | 6 |

These fees have brought to the general fund approximately \$3,600.00 a year. This money is appropriated by the Legislature for the use of the Division. While this is not adequate to finance the Division in all its

activities, it has been of material assistance. It has made possible a regular schedule of inspections and laboratory analyses which has had a marked effect in bringing our supplies to their present quite satisfactory sanitary condition. There is scarcely a public water supply but has been improved during the past thirteen years. There are now thirty-two liquid chlorine plants in constant use. It is estimated that the water supplied to 175,117 of our urban population is treated with liquid chlorine. Water to 81,600 of these is filtered also.

The emergency chlorine plant available from our office has been called into use four times to avert possible epidemics because of unusual contamination of water or failure of the equipment regularly installed. It was set up for this purpose in Big Sandy in August, 1929, at Cut Bank in April, 1930, Harlowton in June, 1930, and in Galen in June, 1930.

We are fortunate in having a new and up-to-date portable chlorinator loaned by the Wallace and Tiernan company of Newark, New Jersey, which was received in March, 1930. We have available at this time, also, a portable machine loaned by the Paradon Manufacturing company of Arlington, New Jersey, which we received in August, 1930. We are now well equipped to care for emergencies and also for experimental work calling for disinfection. There is on hand, also, a limited supply of liquid chlorine for use wherever necessary.

Tabulation of Field Work for the Past Biennium.

Field Inspections

Period November 1, 1928, to October 31, 1930.

Investigations:

| | |
|------------------------------|------------|
| Public water supplies..... | 126 |
| Private water supplies..... | 46 |
| Sewage disposal systems..... | 96 |
| Schools | 5 |
| Miscellaneous | 64 |
| TOTAL..... | 337 |

TREATMENT OF CISTERN WATERS

In certain parts of the state the well waters are not of good chemical quality and waters from contaminated streams are stored in cisterns. Satisfactory means of treating such water has been found in the use of chlorinated lime, the dosage being controlled by means of the ortho-tolidin test. A leaflet on this subject has been prepared and is available for free distribution, and the ortho-tolidin is furnished free to health officers, school authorities or others who are instructed in its proper use.

CROSS CONNECTIONS

The work on cross connections, regulated by rules of the State Board of Health passed in 1926, continues, new ones coming to light as time goes on. The policies followed in this work are based on protection of the public health through the protection of the public water supply. It is possible, however, in some instances to allow cross connections to continue, dependence being placed upon the good quality of the auxiliary supply or the proper operation of safety devices in the cross connection.

CERTIFICATION OF PUBLIC WATER SUPPLIES FURNISHED ON COMMON CARRIERS

This work is carried on in co-operation with the U. S. Public Health Service. Heretofore the director of the division, as collaborating sanitary engineer, has been allotted \$250.00 a year from the U. S. Public Health funds for travel expenses connected with this work. No specific amount has been allotted for the present fiscal year, but the director is, from time to time, traveling on money from this same source. Inasmuch as our principal cities are points at which the trains of one or more railroads are watered, this arrangement is very convenient and helpful. The certificate is based upon standards set up by the U. S. Public Health Service applying to the quality of the water and the conditions in the physical plant. We are able to give certificates to practically all of the thirty-three points listed by the various railroads.

SANITARY CONDITIONS AT THE STATE FAIR GROUNDS

It is the custom of the State Board of Health, with the county health officer, to inspect each year the sanitary conditions at the State Fair Grounds during the State Fair. Heretofore unsatisfactory conditions have been observed, especially as regards the disposal of sanitary sewage. The facilities were obsolete and inadequate. In 1929, largely because of the recommendations of the state and county boards of health, the State Fair Board constructed a concrete septic tank for the collection and treatment of the sanitary wastes from a part of the State Fair Grounds which were equipped with up-to-date facilities. The State Board of Health furnished and operated a liquid chlorine plant to disinfect the effluent from the tank during 1929 and 1930. This system worked very satisfactorily, especially during the State Fair held in August of this year. It is hoped that the State Fair Board will in time be able to extend the system to serve all parts of the grounds.

AMERICAN WATER WORKS ASSOCIATION

The Director of the division has sponsored the formation of the Montana section of the American Water Works Association. There are now about thirty water works managers and superintendents in the state who are active members. The sixth annual meeting will be held in Anaconda in 1931. At these meetings members give papers on subjects drawn from their own experience in Montana. Seven of these papers have been published in the Journal of the American Water Works Association and have thus been given wide circulation.

STREAM POLLUTION STUDIES

The subject of stream pollution is ever before us. While we have been able to make some field studies on individual problems and situations, we have not made a general study or report on conditions as a whole in the state. It is evident that the problems involved are not alone those of the state health board, but involve questions relating to fish

culture and propagation, water for livestock and for irrigation. Heretofore no comprehensive survey of the state's waters has been made by any other state department with the object in view of controlling the situation in the whole territory.

In view of this present situation the director of the Water and Sewage Division has recommended that for the next biennial period a survey be made of the state as a whole through the combined efforts of the Fish and Game Commission, the State Engineer's office, the State Livestock Sanitary Board, and the State Board of Health with a view to obtaining accurate data and the possible enactment of additional legislation to control stream pollution.

The scheme outlined for this work is the formation of a body made up of representatives of these various organizations to be named by the next Legislature, which should give it sufficient authority and financial support to carry on its fact-finding work. Such work should not be expensive, inasmuch as no new personnel need be employed except perhaps some secretarial assistance. There would of necessity be some expenditure for office supplies.

IMPROVEMENTS NOTED

The 1930 census figures show that during the past ten years there has been an increase in our urban population. During these years substantial improvements in public water supply conditions and equipment have been made. Even during the past two years the improvements have been notable. In fourteen situations new pumps of up-to-date design have been installed. In four of these, new sources of water have been obtained.

In Ronan water has been brought by gravity from the Mission Mountains to take the place of that previously pumped from Spring Creek. In Harlowton a new deep well pump has been installed to take the place of the older type of plunger pump set over a pit which doubtless affected the quality of the water to some extent. Havre is now supplied with water from three wells of the gravel filled type under contract with the Fairbanks-Morse Water Supply company. Chinook has dismantled her old and original pump station and has built a modern station in connection with the filter plant. In Gardiner the Water and Light company has met a long-felt need for rehabilitation of its power and pumping plant.

Hardin has equipped an additional filter unit. This one is unique in Montana in that the usual brass strainers are omitted and fourth inch drill holes are used in the laterals. Great Falls is pushing ahead in her program for improvement, having a four million gallon concrete storage reservoir under construction.

Stevensville has extended considerably the underground collection system in attempts to secure her total supply from this good source and eliminate the creek water of unsatisfactory sanitary and physical quality. At Deer Lodge the Commonwealth Public Service company has under construction a drilled well to augment the present supplies.

New and improved installations for chlorine disinfection have been

made in nine situations. Most of our principle cities have full duplicate plants or sufficient parts for immediate use. The Northern Pacific Railway company has put into service a large water softening plant, using the lime-soda ash process followed by filtration through pressure filters.

The first full plant for sewage disinfection has been completed at Polson for the Cramer and Lake Shore Additions. These are residential areas lying east of the main part of town and on land sloping toward the east and north, making it difficult to connect with the sewer systems already installed. The most logical point of disposal being into Flathead Lake much concern was felt over the possible effects upon the lake front and its various features. After a careful study of the drift of the waters in this portion of the lake it was concluded that no danger to appearance of the lake or health of the people would follow discharge of the sewage if the proper precautions were taken. As a consequence, the engineer designed and there has been built a small two chamber septic tank with provision for disinfection of the effluent. The discharge pipe will extend approximately 1200 feet into the lake to a point from which the drift of water should carry the sewage well away from bathing beaches and nearby houses. The plant has not yet been put into service.

The town of Browning has installed a sewerage system as has also the community of Glacier Park, the latter under the legal provisions for rural improvement districts. Missoula has installed an extensive sanitary sewer system on the south side of the city. Miles City has installed extensive storm sewers.

The city of Helena during the past summer has treated the large Chessman reservoir (about 600,000,000 gallons' capacity, when full) for algae control, using copper sulphate distributed from a boat equipped with an outboard motor. Good results were obtained. Ammonia in combination with liquid chlorine was also used for a short period as an experimental method of controlling odors and bacterial after-growths.

REPORT OF THE CHILD WELFARE DIVISION

Biennial Period Ending October 31, 1930

Alma Wretling, R. N., Acting Director

The Child Welfare Division of the State Board of Health was supported to a great extent by appropriations from the Children's Bureau of the United States Government until July 1, 1929. On that date the Act for the Promotion of the Welfare and Hygiene of Maternity and Infancy, commonly known as the Sheppard-Towner Act, expired. Through that act the state received annually a gift of \$5,000.00 and an additional sum of \$8,700.00 which was matched by an appropriation from the state legislature. In addition to this the state legislature also appropriated \$2,000.00 to be used in school and other child health work. In all, the Division was given an annual sum of \$24,400.00 for maternal and child health work.

The 1929 legislature, anticipating the discontinuation of federal funds appropriated \$15,000.00 a year to continue the maternal and child welfare work as carried out by the Child Welfare Division. Another \$3,800.00 was also made available to the Division from the general fund. Naturally with \$6,400.00 less in the yearly budget one or two of the activities of the Division had to be eliminated and the strictest economy practiced in all the activities.

The two activities that seem to be constantly increasing are the distribution of literature by request and the extension of public health nursing service in the state. Infant and Maternity conferences as formerly conducted by the Division have been practically discontinued or replaced by conferences conducted by the public health nurses in which the local doctors make the examinations.

The activities of the Child Welfare Division have included the following:

Co-operative Projects

Constant co-operation has been maintained with all the other divisions of the State Board of Health, and particularly with the Division of Vital Statistics and with the Division of Communicable Diseases.

The Division has continued to maintain one clerk for the Division of Vital Statistics. Her duties include the sending out of certificates and a copy of "Infant Care" to each mother whose child's birth is registered in the office. Many mothers have written to the State Board expressing sincere appreciation for this service. For report on this work please see the report of the Division of Vital Statistics. The Division of Vital Statistics has made a number of interesting studies in regard to birth rates, infant death rates, and maternal death rates for the Child Welfare Division.

Co-operation with Other Agencies

The Division has co-operated with the Children's Bureau of the United States Department of Labor, and with the Extension Service of the State College in giving certain health lessons to women's clubs and to 4-H clubs. It has also co-operated with the State Department of Education, county commissioners, health officers, county superintendents of schools, school boards, city superintendents of schools, the Indian Service, and other official agencies.

It has maintained close co-operation with such non-official and semi-official agencies as the Montana Tuberculosis Association, the American Red Cross, American Child Health Association, National Society for the Prevention of Blindness, State Federation of Women's clubs, State Parent-Teachers Association, Montana League of Woman Voters, and the State Business and Professional Women's clubs. In co-operation with the Montana Tuberculosis Association it has maintained a number of county, school, and field nurses, and conducted one Tuberculosis Case-Finding study. The Red Cross is co-operating to a greater or less extent in the maintenance of several county and itinerant nurses.

The General Educational Program

This program has consisted of correspondence, talks to groups, and the loan of films and slides on health subjects for display throughout the state. A set of nine letters has been sent out to 1,108 mothers before the arrival of the new baby. Many expectant mothers write in to ask for this help—others are reported by the family doctors or by the public health nurses. Many letters of appreciation for this material have been secured.

The most popular educational service, however, seems to be our distribution of health literature. In reply to requests 156,830 booklets, posters, and cards on child health and training have been sent out. The greater number of requests have come from nurses and teachers who have helped distribute this literature to the public. The number of requests from individuals is increasing constantly.

School Work

The schools of the state have been particularly appreciative of our health education work and of the public health nursing service. School boards are now employing public health nurses in Anaconda, Miles City, Billings, Bozeman, Butte, Great Falls, Kalispell, Browning, Lewistown, and a part time nurse is now employed in the schools of Harlem. Dillon also has a part time school nurse—the nurse spending half of her time in the college and half in the public schools.

Public Health Nursing

Under the law the Child Welfare Division is giving supervision to all the public health nurses in the state and providing them with daily record and monthly report forms. In return the nurses are sending to the Division their monthly reports. The Montana corps of public health

nurses on the whole are well trained for this special line of work, either by post-graduate courses or by long experience in their chosen fields of work.

Four nurses are at present employed on a co-operative basis by counties, school boards, the Montana Tuberculosis Association, the Red Cross, and the Child Welfare Division to do itinerant nursing in the state. Twenty-two counties have been served by these four nurses for times varying from one to six months.

There are thirteen nurses employed in counties as county nurses. Their salaries and traveling expenses are paid in full or to a great extent by the counties in which they are working. Some counties are aided in this project by this Division, the Montana Tuberculosis Association, and by the Red Cross.

There are also in the state one full time Tuberculosis Nurse, one Child Welfare Nurse, six visiting nurses serving Metropolitan Life Insurance policy holders particularly, eight Indian Service Field Nurses, and two industrial nurses.

The work accomplished by the Public Health Nurses of the state during the two years includes:

| | |
|--|---------|
| Visits to schools | 4,662 |
| Number of school children inspected..... | 114,148 |
| Number of babies and pre-school children inspected | 12,686 |
| Number of home visits | 54,980 |
| Classes conducted for women and girls..... | 292 |

The Division maintains a placement bureau for public health nurses and endeavors to aid school boards and counties in the selection of suitable nurses.

The Public Health Nurses bulletin is issued monthly, and during the fall of 1929 three institutes for public health nurses were conducted by the Division and American Red Cross.

Other Activities

The Director of the Division of Child Welfare has acted as chairman of May Day activities. May Day is becoming an important Child Health Day in Montana as well as in the other states. A state child health council has been organized to work with the American Child Health Association in promoting May Day work in Montana. One county has also organized a county council which took charge of the May Day program last spring.

The Director of the Division has also served as chairman of the Pre-school Roundup for the Parent-Teachers Association. The object of this work is to secure a health examination for each child who is to enter school for the first time and to have physical defects corrected before the child begins his school work. It has been found that this improves the school work and makes for greater happiness in the lower grades.

The Director contributes an article on some phase of child health to the Bulletin of the Parent-Teachers Association each month.

Summary

The work of the Division is constantly increasing as it is becoming better known throughout the state. It carries on health education and advice through correspondence, literature, exhibits, and public health nursing. This service is extended to expectant mothers, infants, pre-school children and school children. The service to schools is increasing more rapidly than any of the other projects.

It is hoped that legislature will continue to appropriate adequate funds for this very valuable child health work. After all, "The Health of the Child is the Strength of the Nation" as well as that of the state.

BIENNIAL REPORT OF THE FOOD AND DRUG DIVISION

November 1, 1928, to October 31, 1930

W. F. Cashmore, Jr., Director

The chief activity of the Food and Drug Division of the Montana State Board of Health consists primarily of enforcing the provisions of the Montana Pure Food and Drug Acts of 1911 and the rules and regulations of the Montana State Board of Health adopted under the authority granted the Board by that law. Few things are as important as pure foods and potent drugs. To secure these for the consumer and to protect him from the unscrupulous is a big step toward preventing the premature death and increasing the life span of the people of Montana, which is the primary function of the Board of Health. From an economic point of view it is the aim of the Food and Drug Division to protect the consumer by preventing the sale of sub-quantity and quality articles of foods and drugs.

The activities of the Food and Drug Division may be briefly summarized as follows:

1. Enforce the provisions of the Pure Food and Drug Acts of 1911 relative to adulterated and misbranded foods.
2. Make laboratory analyses of foods and drugs to determine whether or not they are adulterated or misbranded.
3. Issue licenses to food manufacturing and handling establishments as required by law.
4. Enforce sanitary regulations governing food handling establishments.
5. Co-operate with local and county health officers in making regular sanitary inspections of food handling establishments and the collection of food samples for laboratory analysis.
6. Co-operate with federal authorities in the collection of samples and solving of problems that are of mutual interest.

INSPECTIONS

Sanitary inspections of food handling establishments are carried on mostly by local health officers and sanitary inspectors. By law, regular inspections are required, the inspection sheets being forwarded to this department and here checked over so that the state office may know the conditions existing in the various districts.

10,291 inspection sheets were turned in to the department in 1929.

12,229 inspection sheets were turned in to the department in 1930.

Many additional inspections are made each year for which no inspection sheets are turned in and of which the state office has no record.

In this connection, our records show that fine co-operation is received from districts where sanitary inspectors are employed. Full-time health officers co-operate quite well as a whole. We receive the least co-operation from the districts in which only part-time health officers are employed.

It is the policy of this department to make visits to each district at least once each year and as often as possible to the larger cities. The state officers are called upon to make inspections of situations which are difficult for the local men to handle. The problems of the work are discussed and an effort made to secure harmony and co-operation between the state and local men.

5,180 inspections have been made by members of the state department. The inspections include all food handling and manufacturing establishments which are licensed. Grocery stores, drug stores and hotels are inspected but not licensed.

LICENSES

Probably the best way of controlling a business is by issuing licenses with the power of revoking same if the business is not properly conducted. The legislature of 1921 took this point of view when it authorized the Montana Board of Health to license the businesses under their jurisdiction and gave the secretary the power of revoking those licenses where the business was not conducted according to law and the regulations made by the board. The following classes of business are licensed: public eating places, meat markets, manufacturing confectioneries and bakeries, canneries, bottling works, soda fountains and soft drink establishments, ice cream parlors, and tourist camps. Licenses are secured upon application and the payment of a \$2.00 fee. Licenses expire on December 31st of the year issued. Licenses are issued with the understanding that the state food and drug laws and regulations will be complied with.

Since the enactment of the law in 1921 the following number of licenses have been issued and the corresponding fees collected:

| | |
|---------------------------|-------------------------------|
| 1922, 2,974 licenses..... | \$ 5,948.00 |
| 1923, 3,064 "..... | 5,128.00 |
| 1924, 2,923 "..... | 5,846.00 |
| 1925, 3,128 "..... | 6,256.00 |
| 1926, 3,460 "..... | 6,920.00 |
| 1927, 3,868 "..... | 7,736.00 |
| 1928, 4,105 "..... | 8,210.00 |
| 1929, 4,268 "..... | 8,536.00 |
| 1930, 4,210 "..... | 8,420.00 (until November 1st) |
| Total 9 years..... | \$64,000.00 |

It is not expected to have a proportional increase for the year 1930. The decrease is probably due to the financial depression and a number of small establishments going out of business.

LICENSES REVOKED

According to Section 2589, the Secretary of the State Board of Health has the power to cancel the license issued to any food handling

establishment when, as a result of inspection, it is found that the business is not conducted within a reasonable degree of compliance with the rules and regulations of the State Board of Health. In all cases the aggrieved person has the privilege of a hearing.

The following licenses have been cancelled in the biennial period:

| | | |
|----------------------|----------------|-----------------------------|
| C. L. Draper..... | Polson..... | insanitary conditions |
| H. B. Kennedy..... | Anaconda..... | license application refused |
| August Goecks..... | Big Sandy..... | insanitary conditions |
| Charlie Yen..... | Kalispell..... | insanitary condition |
| Haaken Severson..... | Bainville..... | insanitary condition |
| J. R. Bowler..... | Glendive..... | license application refused |

LABORATORY WORK

The following number of samples was examined in the laboratory of the Food and Drug Division:

Biennium 1929-1930

| | | |
|--------------------------------|-------|---------|
| Total samples | 1,725 | |
| Classified as Passed..... | 1,357 | or 79 % |
| Classified as Not Passed | 333 | or 19 % |
| Not classified | 35 | or 2 % |

Biennium 1927-1928

| | | |
|-------------------------------|-------|----------|
| Total samples | 1,401 | |
| Classified as Passed..... | 1,045 | or 74.6% |
| Classified as Not Passed..... | 356 | or 25.4% |

Biennium 1925-1926

| | | |
|-------------------------------|-----|----------|
| Total samples | 926 | |
| Classified as Passed..... | 649 | or 70.1% |
| Classified as Not Passed..... | 255 | or 27.6% |
| Not classified | 22 | or 2.4% |

These statistics show that each year the number of samples examined is increasing. It is interesting to note that the percentage of those classified as "passed" is increasing while the percentage of those "not passed" is decreasing. This can be taken to show the increase in the quality of food and drug products sold. As these figures tend to show, approximately 20-25% of samples are objected to. This does not mean that 20 or 25% of products on the market are below standard, because only samples are examined of which there is a suspicion of being adulterated or misbranded.

These analyses were made on such products as hamburger, sausage, wieners, lard, butter, ice cream, cheese, flavoring extracts, seasoning, preservatives and preservative substances, horseradish, vinegar, cider, kraut juice, carbonated beverages, flour, noodles, breakfast food, marmalade, syrup, honey, milk, apples, pears, cider, canned pumpkin, cherries, kraut, peas, corn, also arsenical dips, stomach contents and other miscellaneous analyses and examinations.

The following number of samples was examined for the Dairy Division:

61 Butter; 53 Ice Cream; 6 Cheese.

The following number of samples was examined for the State Horticulturist:

5 apples; 3 pears.

The following number of samples was examined for the Board of Entomology:

4 Arsenical dips; 3 Stomach contents.

Chemical analyses of water are made for Water and Sewage Division when time permits.

The laboratory work has been done by the director except for short periods when finances made it possible to hire an analyst. It is believed that much more efficient and effective work could be done if the appropriation were sufficient to sustain a full-time analyst so the director could devote his entire time to field inspection and office work.

No charge has been made for work done for other departments. This has been done free in the interest of co-operation.

Ninety-seven analyses in the field have been made with what few chemicals could be carried. This eliminated shipping many samples to the laboratory.

PROSECUTIONS

According to Section 2591 the State Board of Health is charged with enforcing the provisions of the Food and Drug Acts. Anyone found to be violating that law or rules and regulations adopted by the State Board of Health is guilty of committing a misdemeanor and may be prosecuted therefor. Upon duly collecting a sample of food or drug and upon evidence furnished by the chemist of the Board of Health, the Secretary may file a complaint with the appropriate county attorney. Such fines assessed, if any, are sent to the State Treasurer and placed to the credit of the general fund.

The following are those prosecuted for violation of the Food and Drug Act during the last biennial period:

| | | |
|-------------------------|-----------------------|-----------------------------|
| Steve Meissner..... | Glendive..... | adulterating hamburger |
| I. L. Swindle..... | Hardin..... | adulterating hamburger |
| I. S. Walker..... | Terry..... | adulterating hamburger |
| F. E. Pierce..... | Billings..... | adulterating hamburger |
| Mr. Wilson..... | West Yellowstone..... | adulterating hamburger |
| H. D. Kelseth..... | Walkerville..... | failed to apply for license |
| J. M. Weggenman..... | Helena..... | adulterating hamburger |
| Joe Deegort..... | Lewistown..... | adulterating hamburger |
| L. A. Hosea..... | Troy..... | adulterating hamburger |
| Opetz & Granger..... | Missoula..... | adulterating hamburger |
| C. E. Adams..... | Paradise..... | adulterating hamburger |
| R. M. Cosgrove..... | Butte..... | adulterating hamburger |
| J. K. Jackey..... | Butte..... | adulterating hamburger |
| Purity Meat Market..... | } Great Falls..... | adulterating hamburger |
| Purity Meat Market..... | | |
| Pacific Meat Co..... | Great Falls..... | adulterating hamburger |
| Andy's Meat Market..... | Great Falls..... | adulterating hamburger |
| W. J. Gruenke..... | Eureka..... | adulterating hamburger |

| | | |
|-----------------------------|----------------|------------------------|
| A. E. Peterson..... | Cut Bank..... | adulterating hamburger |
| Jerry's Meat Market..... | Havre..... | adulterating hamburger |
| J. G. Pederson Company..... | Havre..... | adulterating hamburger |
| Buttrey's..... | Havre..... | adulterating hamburger |
| Montana Meat Market..... | Shelby..... | adulterating hamburger |
| Fred Strom..... | Chinook..... | adulterating hamburger |
| J. W. Goering..... | Hardin..... | adulterating hamburger |
| R. M. Cosgrove..... | Butte..... | adulterating hamburger |
| John X. Jones Company..... | Butte..... | adulterating hamburger |
| Farmer's Exchange..... | Lewistown..... | adulterating hamburger |
| Roy Purdy..... | Bozeman..... | adulterating hamburger |
| J. C. Price..... | Conrad..... | starch in wieners |

From above assessed fines \$688.75 has been turned in to the State Treasurer.

It is not the policy of the department to file a complaint in all cases where objections are made to foods or drugs. In many unintentional cases the offender is warned of the violation and to comply with the law. The department has received fine co-operation in this respect and many violations are settled to the complete satisfaction of all concerned without court action.

SPECIAL INVESTIGATIONS

Since the director of the Food and Drug Division spends considerable time doing field work, a number of special investigations are made that concern the Board of Health as a whole, as well as the Food and Drug Division. The following are some of the special investigations made in the biennial period 1929-1930.

Sale of shoddy mattresses in Butte.

School of Mines' Swimming Pool.

Careless handling of bread boxes with a view to have legislation passed.

Tourist camps—for passage of legislation regulating such camps.

Stream pollution by the Russell Oil Company of Billings.

Use of sewage for irrigation of vegetables at Fort Harrison and Helena.

Eggs sold on market.

Gas fumes, Montana building, Helena.

Sale of Jamaica Ginger at drug stores.

Lissner Spring.

Broadwater camp and resort.

Recommendations have been made upon evidence collected during these investigations and legislation has been passed regulating tourist camps, care of bread boxes, egg laws.

FEDERAL AND STATE CO-OPERATION

The Food and Drug laws of Montana and the regulations of the State Board of Health are patterned after those of the Federal government. It is thus possible, and the policy of the State health department is to co-operate with the Federal department in enforcing the Food and Drug Acts.

While the Federal government has jurisdiction over interstate shipments we are glad to assist in inspections and the collection of samples of interstate shipments.

The department has made inspections with John L. Harvey, J. Edward Kimbel of the Denver Station, E. A. Grey of the Seattle Station, and W. S. Frisbie, chemist in charge of co-operation at Washington, D. C. Samples of apple flour, Kaffee, Health Ore, Frostie, WoWo tablets, have been taken for the federal stations.

Detention of the following was made contemplating seizure:

- 1 shipment Mayonnaise, Butte.
- 1 shipment Vanilla, Dillon.
- 25 pails jelly, Billings.
- 18 cases walnuts, Billings.
- 3 cartons walnuts, Billings.
- 9 cases walnut halves, Billings.
- 6 cases walnut pieces, Billings.
- 9 cans butter, Butte.
- 200 sacks Manamor Poultry Feed, Helena.

Four lots of misbranded goods were held from sale by the state department pending proper labeling:

- 1 Vanilla—Livingston.
- 1 Vanilla—Dillon.
- 1 Vanilla—Bozeman.
- 1 Vanilla—Belgrade.

DRUGS

Having no funds appropriated for any control comparatively little work has been done along this line. Very few drug products are manufactured in this state, so we now depend upon the efficiency of federal inspection to protect against the unloading of misbranded and adulterated drugs into Montana.

TOURIST

The Twenty-first Legislative Assembly passed legislation placing tourist camps under the jurisdiction of the State Board of Health. The Food and Drug Division has charge of the inspection and licensing of these camps.

| | |
|---------------------------------------|----------|
| In 1929 117 licenses were issued..... | \$234.00 |
| In 1930 160 licenses were issued..... | \$320.00 |

Each tourist camp is inspected at least once each year and the regulations adopted pertaining to tourist camps are enforced with the intention of protecting the health of the tourist visitor and making his stay in Montana pleasant. A decided improvement was noted in the condition of these camps since the tourist camp legislation was passed.

CLERICAL WORK

The department does a large volume of clerical work each year. Form letters are sent out to the establishments, keeping them informed of new regulations and standards. Placards are sent to all establishments stating the regulations governing each particular business.

Approximately 18,000 form letters, 8,000 placards, 1,500 letters and correspondence have been sent out during the biennial period.

HOTEL INSPECTION

The state law requires an annual inspection of hotels by local health officers. Copies of state laws and regulations are furnished for distribution along with inspection blanks for health officer's inspections.

During the past biennial period 483 hotel inspections were reported to this office. Particular stress is laid on cleanliness, bedding, length of sheets, ventilation, vermin, and fire escapes.

PERSONNEL

Mr. Vance B. Erickson was employed from June 20, 1929 to January 31, 1930 to do analytical work for the Food and Drug Division and chemical analyses of water for the Water and Sewage Division.

Mr. Glenn D. Wiles resigned his position as Director December 31, 1929, to accept a position with the American Can Company at an increased salary. W. F. Cashmore, Jr., was appointed to succeed him on January 31, 1930.

